BREAK-IN

May/June 2013

The Official Journal of the
New Zealand Association of Radio Transmitters (Inc.)

Dedicated to

Amateur Radio and Electronics

in New Zealand since 1928

In this issue:

- A Three-Way Coax Switch
- Fox-Delta power/SWR meter kits
- Faulty terminals
- Technical Convention Easter 2013
- Please QSL via eQSL.cc
- The Australian Army Signals Museum
- How to spot a ham radio Internet rat
- Your Council for 2013-2015
- NZART AGM; Additional Annual Reports
- ZL Crossword 22

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*The term **break-in** refers to a system in CW whereby the transmitting station can hear the other station's signal during "key up" periods.*

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Cover Photograph; Branch 69 operated in the QRP section with solar power at the Otaki Airstrip. (Photo by Kevin Henderson).

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PAST ISSUES OF *BREAK-IN*
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Fred Johnson ZL2AMJ
Ted Linney ZL2TB

Council—Midlands District:
Philip Holliday ZL3PAH
Stuart Watchman ZL2TW

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Terry Thomas ZL4TAE

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From The Editor

John Walker ZL3IB
<editor@nzart.org.nz>

Following the NZART elections earlier this year we are taking an opportunity in this issue to introduce both the new and old members of NZART Council. We hope that members will appreciate this opportunity to learn more about their elected representatives since January/February of *Break-In* only included the biographies of candidates actually standing for election. Maybe we should also print short biographies of some of our NZART officers in future issues; what do readers think? I should appreciate some feedback.

I should also like to take this opportunity to thank retiring *Call Book* editor Lorne Douglas ZL2AHB for his sterling efforts over the past five years. Lorne has been responsible for major upgrades in the contents of *Call Book* and he has also been responsible for the production of the *Call Book* CDROM which also includes pdf versions of previous years issues of *Break-In*. I am sure we all find these CDs invaluable sources of reference.

Finally I should like to stress the need for contributors to endeavour to send their copy to the Editor as early as possible before the closing date of the 10th of the month preceding publication. I am sure that you can imagine the pressure on myself and our busy typesetter if everything arrives at the last minute. Thanks for your cooperation.

73, John Walker ZL3IB

Next deadline for copy is
10 July 2013

Contributions to Break-In

Break-In is a forum for NZART member's amateur radio projects, experiences, opinions and news. Your contributions and feedback is welcomed. Contact the Editor John Walker ZL3IB at <john.zl3ib@ihug.co.nz>

New Zealand Association of Radio Transmitters INC

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From The President

Vaughan Henderson ZL1TGC
<zl1tgc@nzart.org.nz>

I would like to take this opportunity to thank all of you who took part in the recent elections for the Midlands District Council position of President. Nearly 900 members took the time to complete the voting procedure and as a percentage of our total membership, was a very good response. My thanks to those of you who voted to elect me as President, I will try and live up to your expectations!

This issue of *Break-In* will be in your hands in early June, just after our annual general meeting and Conference in Masterton. As I write this in early May, with a little over three weeks to go to Conference, it is very pleasing to report a good level of interest from members with more still to register before the cutoff date.

I've also had feedback from some members who tell me that, as much as they would like to attend, the combined cost of transport, accommodation and conference registration is beyond their resources in these tight economic times. This is a very real consideration for many of you and I'd appreciate your input on how we can try to reduce the cost of the overall conference experience. Your Association is very dependent on Branches around the country being willing to host the annual conference and finding the usually small band of volunteers who give up their spare time form a committee to run the conference. As I write this, we don't have a Branch who has offered to host our conference for 2014. I am hopeful that this will change when the call goes out at this year's AGM for an offer to host next year's AGM and Conference. If we don't get anyone willing to do this, then we may have to revert to a one day event held at some central location, probably Wellington, in order to hold an annual general meeting. Please let me, or your local Councillor, or Debby at Headquarters know if your club is willing to host the 2014 AGM.

In response to feedback from members about our web site, Council has agreed that our current web site is overdue for a new look, especially the front or home page. Please note this is not a criticism of our webmaster, Alan ZL1AMW who is doing an excellent job of keeping our web site up to date. What we are looking for is an individual or individuals who could work up a new look for our web site. Do you know anyone who could help in this area? If so, please let me know. Maybe a complete web site re-design is what's needed or just some re-work to make the initial impression bigger, brighter and better! If you have some web site design skills and would like to become involved, I'd be pleased to hear from you. You can contact me by email at <zl1tgc@nzart.org.nz>

Keeping a watchful eye on our expenditure is a very necessary if somewhat thankless task. To assist our Treasurer, Evan Sayer, Council has formed a Finance Sub-Committee lead by Councillor Phil Holliday ZL3PAH. The other members of the sub-committee are myself, ZL1TGC, Phil King ZL1PK, Stuart Watchman ZL2TW and Terry Thomas ZL4TAE. Terms of reference for the sub-committee have been determined and the specific tasks to be undertaken are as follows: To assist the Treasurer in the preparation of the NZART annual budget; To review and if required update the budget as appropriate during the year; To plan the long term financial affairs (five year plan) for NZART; To investigate, quantify and minimise any financial risks to NZART; To investigate any other areas of operation which have a financial impact on NZART, and to make recommendations. Good progress is being made on these tasks. Areas being focussed on to try and achieve significant cost savings are Headquarters Operation and *Break-In* production costs. To try and bring in more revenue, I am going to contact the nearly 300 members who have not yet renewed their subscriptions for 2013. If these initiatives are successful, then we should end up at the end of the 2013 year on the right side of the ledger.

Elsewhere in this issue of *Break-In* is a letter from Fred Johnson ZL2AMJ and my response to that letter. ZL2AMJ's letter is in response to the Infoline Special Number 39 sent out in May. I will not comment further on it here but I do encourage you as members to read the Infoline information and invite you to reach your own conclusions.

On a more positive note, we have had a good response to the request for submissions on a possible revision of the 70 cm band plan. Submissions closed on 20 April and a total of 27 individual submissions were received from interested amateurs, plus three submissions from Branches. A summary of the submissions indicated a strong preference for closer alignment of our 70 cm band-plan with the Australian one, especially in the weak-signal area, and to have wide-band modes (e.g. ATV/DATV) removed from the band plan. The working group lead by Phil King ZL1PK will now work through the submissions in more detail and prepare a revised band plan for circulation and comment.

Vaughan Henderson
President, NZART (Inc.)

Break-In 50 Years Ago

Craig Crawford ZL3TLB

***Break-In* 50 years ago**
New Club Rooms – A Dream Come True
Break-In May 1963

ZL3WS, Christchurch Branch Transmitting Station, now has a home. When the Mayor of Christchurch, Mr George Manning, opened the new Club Rooms on Saturday 20th April 1963 many "hams", friends and visitors were present to celebrate a "red-letter day" in the history of the Branch. Not even the showery cold afternoon could dampen the enthusiasm of those present, who were warmly welcomed by Clive Liddell ZL3ND, Branch President. Greetings were also conveyed by George Blackwell ZL3NT, the Third District Vice-President.

One of the problems facing a large branch is that of finding suitable permanent accommodation at a reasonable cost near the centre of the city. Over the years Christchurch Branch has had the use of different premises for its monthly meetings. Until now a place suitable for meetings, workshop, transmitter and storage has been something hoped for but beyond the realms of possibility. Then last year the Branch heard that the former Saint Francis Private Day School in Avonside had gone into recess and the buildings were not being used.

Negotiations took place over the months and at last an agreement was reached that the Branch could have the use of these premises if the members were prepared to repair, renovate and repaint them, all the materials being supplied for the purpose by the trustees of the property. It looked a hard and weary task, for the paint and woodwork were in a really bad condition. The rooms were drab and dingy inside but had great possibilities.

Through the enthusiasm of the committee who organised the labour force each Saturday there has been a great transformation. The new Club Rooms are situated about two miles from the centre of the city on a large back section with a tar-sealed yard providing plenty of parking space. There is room also for the 80 metre half-wave antenna which has been erected.

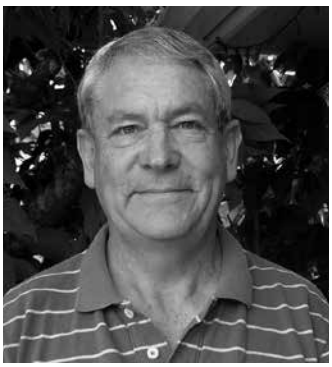
On the morning of opening day, in between the showers, a marquee was erected for afternoon tea. Final cleaning of windows, rooms and ground kept a large number busy, while finishing touches were being made to the display of radio gear in the workshop. In the midst of all this activity a photographer and reporter from the evening newspaper arrived, while at the same time a film for the evening TV news session was being shot.

The reports through the newspaper and on TV have given the Branch plenty of publicity. Through the generosity of "Tricity House®" an excellent window display of home-made and commercial amateur radio equipment has created a great deal of interest. The new Club Rooms has been the theme of this display with photos of the premises and classes in action given prominence.

Your Council for 2013-2015

Unfortunately many members would have been unable to attend the 2013 NZART AGM and Conference in Masterton and get to meet past and new Councillors. We are therefore including short biographies/CVs in this issue of Break-In so that members can know more about their elected representatives.

President
Vaughan Henderson ZL1TGC



First licenced in 1968, my amateur radio activity to date has been mainly on the VHF and UHF bands. The level of QRM at my QTH in Auckland precludes anything except local operation on the HF bands! As time permits, I enjoy construction of electronic and amateur radio related equipment as well as taking a keen interest in new technologies and their impact on amateur radio. I actively support the activities of both the North Shore Branch 29 and the Auckland VHF Group. At Branch 29 I am part of a small team who run weekend classes for the amateur examination and this has been most successful as a way of bringing new people into our hobby as well as increasing NZART membership. I am a repeater trustee and National System Trustee for the Auckland VHF Group, Branch 66.

I have enjoyed a varied technical career, starting as a telecommunications technician, followed by some 14 years as a computer network engineer. From there, moved into marine electronics and am currently self employed as a marine electronics engineer, mostly working on maintenance and re-fits of larger recreational and commercial vessels. I am married with two adult children and three grandchildren.

I have been a member of NZART Council from 1981 to 1985, and again from 1991 to 1998, served as Vice-President from 1999 to 2002 and again from 2006 until early 2011 when ZL2KH's resignation as President resulted in my becoming the "un-elected" President for the balance of the current term in accordance with the constitution. My thanks to you, our members for your vote of support for me as your President for the next two years.

I want to do more to actively promote amateur radio; to encourage Branches to recruit new members leading to an increased membership of our national association. With an increase in membership, we can then look at the opportunity to reduce subscriptions or improve the benefits of belonging to NZART. I also want to improve the level of communication between Council and the membership, to try and keep all members better informed on current issues. There is no "magic wand" that will solve all the challenges facing us as radio amateurs but by taking a positive approach to our future, and with your support, I hope to be able to continue to lead a progressive Council, focused on providing added value to you, our valued NZART members.

Vice-President
Stuart Watchman ZL2TW

I am a 48 year old father of two and grandfather of one. After leaving school I trained in the NZPO as a telephone then radio technician in Auckland and Christchurch, I then went to Otago University. I have worked the last 15 years as a Doctor in the emergency department of Blenheim's Wairau hospital. I find my mixed background is useful on council: technical knowledge, and from working in the front line the ability to keep a clear head under pressure.

I have previously served on NZART council from 2005 to 2009, including holding the position of vice President from 2007 to 2009. I was appointed back to council in 2011 to fill a vacancy.

I am actively involved in the Marlborough amateur radio club, helping organise communications for sporting events, AREC and construction of equipment. I manage the Jock White field day and actively participate as part of the Marlborough team.

I believe the most important role of a councillor is to ensure the good governance of NZART to act in the best interests of all NZART members, irrespective of the councillor's radio interests, personal interest or branch. I am particularly interested in the future financial security of NZART.

Stuart Watchman ZL2TW

Northern District Councillors

Neill Ellis, ZL1TAJ

I was initially licensed as ZL2TOW in Taihape in 1983. Now residing in Tauranga. Trained with NZPO/ Telecom in Telecommunications including radio, telephony, transmission & data spending a reasonable period in Network Design & Build. In 1995 I joined Bluestar®, who had bought Business Systems from Telecom®. I joined Baywide Communications as Service Manager in 1998. Since then, I have spent time doing I&T work and even a short stint gaining experience with appliance servicing, before changing to biomedical in 2007. I am not as active on the bands as I perhaps should be, but am reasonably active in the background of several Branches and also on NZART Council. Since joining Council, I am now Immediate Past President of both Tauranga Districts Br 39 and Te Puke Br 53 of NZART. I am still on the Committee of Waikato VHF Group Br 81. I feel NZART should only make changes when the interests of membership are considered, preferably by consultation. In addition any changes to the GURL or PIB46 that affects all Amateurs should involve the opportunity for all Amateurs to be considered if at all practical. I feel Council needs to start adapting the organisation to better reflect the current and future requirements of its members and these changes should also involve consultation with members as often as practical.

Stephen Hayman ZL1TPH

Hello all. The idea was raised that the successful nominees for the 2013-2015 national executive, present a short summary of introduction and amateur interests to the membership under the banner "Your Council for 2013-2015"

Firstly having completed my first term on NZART council (2010-2012) I received a nomination, which I accepted for the next two years, an ongoing commitment to the Association was the deciding factor.

What I would like to see achieved over the next few years, is long term financial planning along with sustained membership growth to the Association with sound management principles based upon setting goals, planning how to achieve those goals, organising and checking to ensure the desired results are achieved.

Another interest is what other services the Association can provide to the members, along with what services we can improve upon. This requires input from the members and non-members. Rising costs also need to be addressed with maybe moving to digital media options at some point of time in the future.

Interest in AR all HF bands through VHF/UHF to microwave operations and also home construction of equipment and antennas. Other interests are the Monitoring Service, or reporting of intruders in our bands and scribe to the OTC column in BI.

I'm 56 years of age, married, reside north of Auckland city, am self-employed owning a small business in partnership with two others.

Should anyone wish to contact me they are more than welcome at <zl1tph@nzart.org.nz> and on a final note would like to say, will continue to the best of my ability and all enjoy your pastime of amateur radio.

Phil King ZL1PK/ZL1AWQ

I have held an amateur license since my final years at secondary school. My initial call-sign was ZL1AWQ (1959) followed by ZL4KZ, ZL3AAK and finally ZL1PK as I moved around the country as a Telephone Exchange Technician, Carrier Technician and REA with the Post & Telegraph/ Post Office/ Telecom. I also spent a brief period as a Radio Technician Trainee at Musick Point station in the early years. Later I moved into Computer Operations with Telecom and Waikato District Council. I am now retired from routine work.

My first transmitter was a series-modulated AM one on 80 m using 6AQ5s and running from a genemotor on the DC mains in Grafton Road Auckland. Nowadays I use a selection of Japanese transceivers.

My interests in amateur radio are many including Construction, Digital Modes, Amateur Satellite operating, AREC, and some DXing. In my 54 years in amateur radio I have seen many changes and will no doubt see many more.

Our avocation faces many challenges; from changing technology; from those that feel they could make better use of our frequencies and from the changes that occur in our society. For our avocation to continue we must all work together. My focus is on meeting these challenges, keeping up with developments affecting ham radio and strengthening NZART.

Central District Councillors

Warren Harris ZL2AH

Hi all. I am 36 years old. My partner Charlotte and I live in a rural setting near Dannevirke. I grew up in Hastings, and have lived in Hawkes Bay most of my life. I did my apprenticeship as an electrician in 1995, and have since been registered as an electrical inspector, an electricity network operator, and an approved training provider for electrical competency. I find the attention to safety and regulation important in my role and I can apply these skills equally in the radio world.

This term is my second term on council, and while I am still comparatively a newbie, I am enjoying the challenges from this role, and finding new ways to grow the association and the hobby as a whole.

My radio activity includes being past president for Branch 13 HBARC for 8 years. I also actively participate in Jock White field day, VHF Field Day, and various car rallies and other event / training communications. I am also working towards my DXCC using only LoTW confirmed contacts.

As a councillor my input has been varied. I actively voice support of our radio frequency privileges, while always remembering that someone somewhere needs to pay for the costs that NZART incurs. Some of these costs are significant and always need to be weighed up against benefits they provide. With the dual officer role of training officer and deputy ARX, I am always actively promoting ways of recruitment into the hobby for the betterment of NZART and amateur radio. This is vital for the on going survival of the hobby and the association.

Warren Harris ZL2AH

Fred Johnson ZL2AMJ

Over several decades, experienced Technical-Correspondence-Institute-trained tutors and others led by ZL2AMJ compiled training material into a coherent form, free to anyone wishing to be a radio amateur. Student-friendly, many features, text-to-speech eBook and Android readers, it replaces the year 2000 material. Every kid in the country with a cellphone could run it. "*Radio Wave*" demonstration kits and hand-out CDs are developed. Copyright has been asserted in the required and proper ways. So "let's make it all go!"

Licensed when a schoolboy with home-constructed stations and activity on most bands and modes, now retired, professional radio engineer, tutor, technical institute inspector, and long-time Head of Electrical Engineering at New Zealand's largest polytechnic.

Honoured as Member of the New Zealand Order of Merit (MNZM) for service to amateur radio; received awards from IARU societies for promoting international goodwill; Honorary Life Member of NZART; Past-President and NZART Councillor; member of several Branches.

Ran Amateur Radio Administration courses in Tokyo, Ho Chi Minh City and Tehran when Director and Chairman of IARU Region 3. On official New Zealand delegations to ITU conferences, instrumental in protecting spectrum access and clearing 40m band broadcasters.

NZART must turn strong by leadership and governance with advice from subject experts to promote members' interests to government and protect spectrum access and intruder removal. Experience is offered with passion and commitment, time, skills and resources. Post-election and pre-appointment training for Councillors is NZART's highest priority need.

Ted Linney ZL2TB

I first joined the amateur ranks in the late 60's while still at secondary school; obtaining a "T" call and moving to a full licence a short time later with the help of members in Branch 18. I have a very wide interest in all aspects of amateur radio with a particular emphasis on homebrew construction and in the wider technology field. I am an active member of NZART Branches 18, 50 and 74.

My professional experience has mostly been in the broadcasting industry with Kordia and its various predecessors in Network Operations, Microwave Engineering and TV Transmission. I gained RTC and NZCE (telecoms) in that period. My wife and I have also owned and operated a motel in Wellington. I have recently retired after working for 8 years in the field of industrial relations and advocacy.

These are times of huge opportunities and challenges for Amateur Radio. The emergence of new digital technologies at affordable prices and the ability of these to be linked together is bringing entirely new experiences within the scope of the hobby. I see the main challenges ahead are in bringing new people into the hobby and NZART using this developing synergy coupled with the more traditional aspects of the hobby and in ensuring we maintain/expand access to spectrum.

I am keen to join NZART Council with a focus on using good governance oversight to support the many talented volunteer Officers of our Association and others who contribute so much to the development and wellbeing of our hobby.

Ted Linney ZL2TB <tlinney@paradise.net.nz>

Midlands District Councillors

Phil Holliday ZL3PAH

I am Phil Holliday ZL3PAH, 66, councillor for the Midland Region and live in Sumner, Christchurch. I was co-opted onto council last year after a Midland Region councillor stepped down and was elected at the last election.

My intention in standing for council was to use the skills I have to ensure that NZART adopts prudent financial management and engages in longer term planning, and in setting a strategy and actions in place which will allow NZART to continue and prosper into the future.

I have been licensed for 48 years, first as G3UVZ and since 1990 as ZL3PAH when I came with my family to Christchurch. I am a keen HF operator, mostly CW, am on the air almost every day, love contesting and am a founder of the ZL3X Quake Contesters Group.

My hobby lead to a degree in electronics and in my professional life have designed amateur, marine and land mobile radio equipment for various companies in the UK, working my way up from bench engineer to director and general manager. On coming to Christchurch I started my own electronics and software design company which I sold to a UK based listed company in 2000. I then invested in several technology companies and have just sold the last one to a large US Fortune 100 company. I am now semi-retired but work part time in the early stage company and venture capital space.

My other interests include cooking (not bad), music (rock, blues and flamenco), The Crusaders (very one-eyed), our dogs (noisy) and my wife and family (who are fabulous).

Stuart Watchman ZL2TW

See above

Southern District Councillors

Terry Thomas ZL4TAE

First licensed as ZL1TAR. BR 44 Matamata in 1962. Enjoyed building gear for 2 metres, did a VHF FD in 1963 with the local lads and blown away when we contacted a station on Egmont from Kaimai's on 70 cm!

Family moved to Dunedin in 1964, Joined Branch 30, Call-sign now ZL4TAE.

Joined NZBC Tech Trainee in 1965

Qualifications: First CRT, Radio Technician's Certificate, NZCE (Telecommunications). Self employed since 1981, re-joined Branch 30 in 2007 and met David ZL4DK. We have successfully operated VHF FD's together for the last 6 years and two DXpeditions to Knights Point

Known in Amateur Radio circles across the province through business connections, FD ops and as a supplier of radios to many southern SAR and AREC groups.

Currently operating a small Land Mobile business throughout Otago and still designing and building VHF gear. Active member of Br 30, NZART Councillor for past and future 2 years and a committee member of Radio Frequency Users Assn of NZ (with interests in Land Mobile radio)

Terry Thomas <terry@teradio.co.nz>

Forthcoming articles

It is hoped to print the following articles in the next issue of *Break-In:*

- Report on NZART Conference 2013.
- Near field interference from transmitting antennas.
- What the heck is a dongle?
- Fun with a Baofeng UR-5R handie-talkie.
- EME on 1296 MHz.
- A Chatham Island experience.

Plus your article when received.

REMEMBER:

Leave a three second pause between overs when using repeaters.

Someone else may have an urgent message.

NZART Radio Science Education Trust

Application for Grant-in-Aid

Applications are invited from secondary school science teachers and other training providers for Grants-in-Aid from the NZART Radioscience Education Trust to promote the development of projects in the general areas of radio and/or electronics. It is anticipated that these projects will lead to entries in the local area Science & Technology Fair. Grants will not normally exceed $250.00

Applications should normally be received no later than 30th May of the year of application. Application forms maybe obtained from; The Trustees, NZART Radioscience Education Trust, PO Box 1733, Christchurch 8140, or from <trustee@nzart.org.nz>. Applications should be endorsed by the Head of Science or, for other organisations, the President/Chairperson.

A Three-Way Coax Switch For Under $40

by Tony Stroobant ZL2ATZ

After thirty years away from ham radio I found I lacked the usual useful accumulation of bits and pieces needed for making life easier around the ham shack. With no junk box to speak of, where was a three-way coax switch when I needed it?

I had a "new" FT-101E transceiver and FRG-7 receiver, and a home brew QRP rig. I also had one antenna, but soon got fed up with having to unplug and plug between rigs. I thought of buying a commercial three-way coax switch, but wondered what I might be able to make for myself.

It turned out not to be as simple as I first thought. As well as switching one port between the other three, I needed the unused ports to be grounded. This appears to be the practice with most, if not all, commercial units. When the switch is used in the conventional way to connect one rig to several different aerials, it appears desirable to short the unused ports to ground to avoid coupling unwanted signals, or QRN, through the switch to the port in use. Some manufacturers also claim this as a safety feature in the event of lightning strike.

In my case, I intended using the switch to connect one of three rigs to my one and only aerial. I want the unused ports shorted to ground so that transmitter energy from the rig in use is not spuriously coupled into the front end of the rigs not in use.

So, I now needed an arrangement that would switch one port to any one of the other three, while shorting the unused ports to ground. As best I could work out, this required a three pole, three position rotary wafer switch capable of handling transmitter-level RF voltages and currents. No such thing appears available locally any more and, with the cost of exchange and postage, overseas switch prices were approaching the cost of a fully built unit!

Based on an idea found on the internet from AØFRI [1], the following item can be built for under $40 in parts; half that if you already have a suitable metal box. Rather than a rotary wafer switch, three double pole slide switches are used. I picked the most substantial ones I could find (Jaycar® Cat No. SS-0812). I have run up to 100 watts PEP output, with no problems so far.

In the accompanying circuit diagram, for simplicity the switches are shown as single pole. In practice, the two poles of each switch are simply wired in parallel, as shown in one of the photos.

In use, port J1 may be switched to any one of the three ports J2-J4 and when any of these ports is not in use it is grounded. A mechanical interlock (shown in one of the photos and described below) prevents more than one port, J2-J4, being connected to port J1.

In principle, the switch could be made more than three-way, of course, simply by increasing the number of slide switches and corresponding coax sockets.

Once built, the switch was tested. It is so simple that it worked, of course. The question was; how well? The switch contributed no discernible increase in SWR up to 30 MHz. The isolation between the used and the unused ports is better than 60dB at frequencies up to 7 MHz, falling to around 40 dB at 30 MHz. All these figures are only approximate, however, as they were arrived at using only basic ham gear, not sophisticated measuring equipment; not to mention my somewhat rusty maths! However, the figures seem to compare well with commercial units, but only at these frequencies. What they might be at higher frequencies is untested.

Construction should be clear from the circuit diagram and the two photos. The switches and coax sockets are housed in a die-cast aluminium enclosure (or what have you) and connected with heavy gauge tinned copper wire.

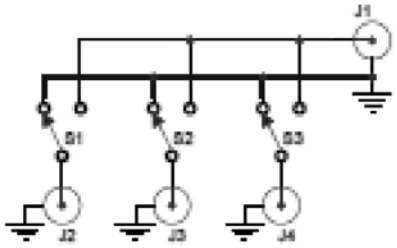
The mechanical interlock is made from a strip of Perspex® which slides back and forth under the heads of two screws mounted on the front of the box. The strip prevents any of the switches from being turned on, except when a slot in the strip is opposite one of the switches. There is only one slot, so only one switch can be on at any one time. (This may be easier to see in the photo than it is to explain!)

The interlock is a bit fiddly to make and fit, and you may decide it is unnecessary if you are using the switch simply to connect your transceiver output to any one of three aerials. It is unlikely to prove fatal if, by mistake, you connect two aerials to your rig, on low power, at the same time.

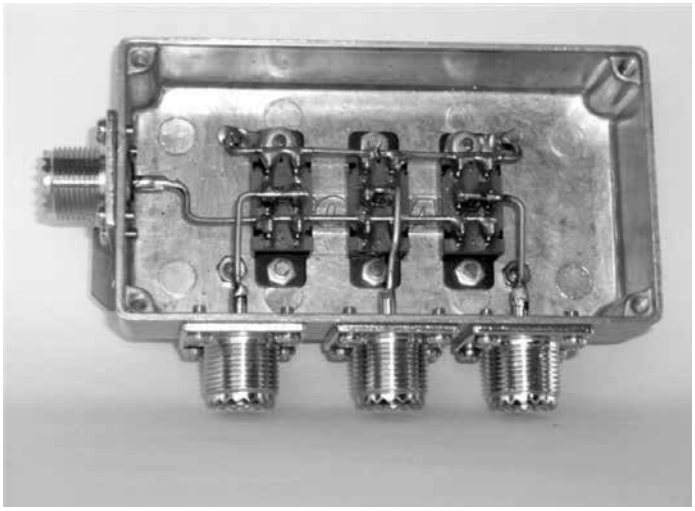
But in my case, when I am switching three different rigs to one antenna, the interlock is essential so I do not inadvertently connect the transmitter output of one rig to the receiver input of another! βi

Reference

[1] <http://www.dxzone.com/cgi-bin/dir/jump2.cgi?ID=14946>



Coax switch; circuit.



Coax switch; interior view.

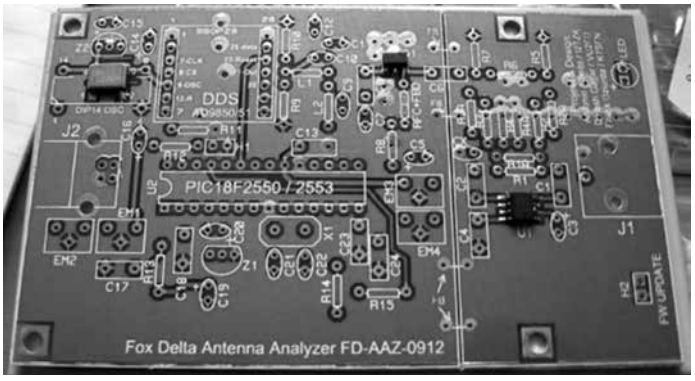
Coax switch showing interlock plate.

Fox Delta power / SWR meter, antenna analyser and audio interface kits

by Andrew Barron ZL3DW

I like building kit sets because all of the hard design work and prototyping has been done for me and also in most cases the difficult and expensive process of producing a printed circuit board and collecting all of the required components. Due to the high cost of electronic components in New Zealand, especially if you are buying in small quantities, many kits cost less than the local value of the components. Fox Delta has a wide selection of kits for electronics enthusiasts and hams. So far I have built three of them; a simple sound card interface, a USB powered 200W / 2kW HF power meter and the USB powered antenna analyser. Fox Delta is a collaboration between Dinesh Gajjar VU2FD, Antonio Alfinito I2TZK, and Frank Dziurda K7SFN. I ordered all three kits at the same time to save postage costs but the power meter arrived in a separate parcel anyway. The service and emails from Dinesh and Nina Gajjar were excellent. They shipped the kits two days after my order and supplied the India Post tracking numbers which successfully tracked my parcels right through to delivery at home 12 days later. I did have an issue with my credit card not being accepted by the '2CO' agency that they use for payments. A quick email resolved the problem; apparently the issue has been reported by other NZ buyers as well. There is an alternate Paypal® shop at: <http://www.foxdelta.net/shopping/>.

Each kit comes with the components in individually marked bags.



The PCB is good quality with marking both sides and plated through holes. Surface mount components are already mounted. Note the separate earth plane for the RF section of the analyser board.

The kits seem to be very good value for money and I am pleased with the results. However you do need good soldering skills and you may have to do minor fault finding. Two of the three kits had faults that I had to locate. You do not have to solder any surface mount devices. The antenna analyser has several surface mount integrated circuits and some chip capacitors, but they are already soldered on to the circuit board when you get the kit and the DDS chip and associated components are on a small daughter board which just plugs in. The Fox Delta kits do not come with step by step instructions, but the pc boards are good quality with plated through holes and silk screen markings. Online documentation includes high quality photos, schematics, parts list and setup instructions for the more complex kits. Each kit comes with lots and lots of plastic bags each containing a labelled value of component, for example four 100 Ohm resistors in one bag, one 1k Ohm resistor in another. All of the components were supplied correctly. When constructing kits, I start with mounting and soldering the small components like diodes, RFCs and resistors that lie flat to the board, then I proceed to capacitors, active devices and connectors. I open a bag and install all of that value of component, tick it off the parts list, then move onto the next bag. The kits come complete with powder coated steel cases, standoffs and mounting screws. The case quality is fairly poor and purists might prefer to house their kit in a better box. There are no labels provided, but I made my own by laminating paper labels and sticking them on the boxes with double sided tape. I also replaced some of the mounting screws and standoffs. Two of the longer mounting screws seemed to be stripped, they have a very fine thread, so I replaced them with M3 screws which are a similar size.

The sound card interface is very simple with transformers to isolate the audio lines and an opto-coupler to isolate the PTT. I had no problems with the assembly at all. The cables I needed to connect to the PC and the transceiver ended up costing more than the $US35 kit, but the overall cost is still much less than similar commercial interfaces. The power and SWR meter is really two kits, one containing the power meter display and computer, and the other a remote switched 200W / 2kW forward and reverse power measurement, bridge. The power meter unit can display SWR, forward and reverse power, for up to two measurement heads at the same time. DC is supplied from a computer USB port or a USB style power adaptor but a PC is not required for operation. Optional free PC software gives you the ability to change the configuration settings from your PC and displays the power meter readings on a variety of different meter styles. It also includes a very useful peak hold indication on the forward power measurement. There was no meter scale for 0-200W so I modified two of the images and sent them to Tony I2TZK and they are now distributed with the software.

Teething troubles

During initial testing of the power and SWR meter, I had an unusual fault on the display section. A premade cable, supplied with the kit, that connects the LCD display board to the main pc board had one open circuit wire resulting in no back light on the LCD display. On removing the wire from the connectors, I found that it was crimped both ends and looked fine but was not conducting. A quick soldering job and all was fine. I also had a problem with the power measurement bridge, this time of my own making. I was not getting any forward power reading and was initially worried that I had somehow damaged the sensitive forward power metering diode. But it turned out to be an open circuit RFC on the metering line from the bridge to the power meter. I had bent the leads too tight because the holes on the pcb were a little too close together for the size of the RFC that was supplied.

The antenna analyser was the first kit I started but the last I completed. After assembly it seemed to work... but not very well. A good 50 Ohm load measured as a flat line but with only around 15 dB return loss and

Faulty terminals

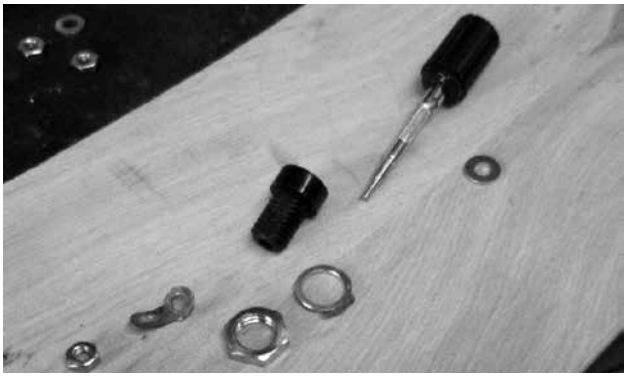
by Ross Weir ZL3TFK

At a remote horse paddock at the Canterbury A and P Show, we hooked up a 12 V car battery to a 60 W, 12 V, Toa™ PA amplifier, using a battery lead with fork terminals. It did not go. Opening up the amplifier case, we found no 12 V DC coming in via the terminals. The battery wires were then soldered direct to the amplifier's internal wiring and all was well. Nothing was found on later investigation (we expected a broken terminal) but the terminals were changed anyway to Belling-Lee® types.

This week in the shack, a booster RF amplifier was left running off a regulated supply while we went to the distant receiver to evaluate the speech circuit. No success; it was found upon returning to the workshop that there was no 12 V DC on the Class C amplifier. This time a cause was found! The fork terminals on the DC lead to the amp had no 12 V on them, but the PS terminal posts did! The fork terminals did not contact the shaft, but were up against the metal washer of the terminal. This did not have continuity to DC as it is a separate washer pushed onto the terminal's shaft at manufacture. However there is no problem if one pushes a bare wire through the hole on the terminal shaft.

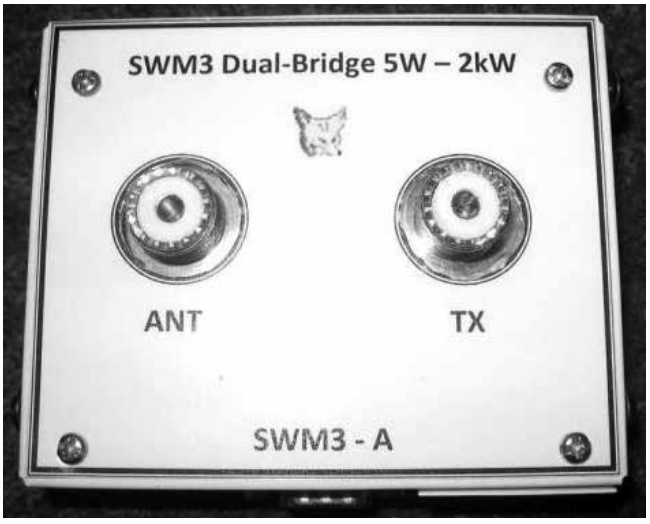
Compare this Asian product to that of Belling-Lee. The B-L one is turned out of the solid and has flat contact surfaces both sides of any fork terminal; see the photo of the yellow B-L terminal. Why yellow? With the change of 3-phase colours from yellow to white, my employer had plenty of surplus yellow terminals ex the test lab! βi

Original Asian terminal. Note the loose washer on the shaft, also the lack of a metal surface on the knob part.



Replacement Belling-Lee terminal. Note the turned, solid shaft includes flat shoulder, and also the shoulder on the knob part.

Fox Delta SWM-3 USB power meter kit.



The dual 200 W / 2 kW measurement bridge.

my antenna seemed to have negative return loss! The trace disappeared off the top of the display. I could not see anything obviously wrong and all of the voltage test points were OK so I shelved the project and built the other two kits. Finally I dragged out my oscilloscope and tried to find the problem. It turned out that the 125 MHz clock output to the DDS synthesiser, had not been soldered to the board. This was "not my fault" as it is one of the surface mount devices that had supposedly been pre-soldered. Now that the fault has been fixed the kit works well with my 'good' load measuring a return loss between 50 dB at 1 MHz and 42 dB at 35 MHz, a 20 W Type N load measures flat across the band at 40 dB, and my 100 W load measures flat at around 22 dB which is quite acceptable. It turns out that the match to my home made 3 element Yagi is not as good as I thought, with in band SWR readings between 1.2 and 1.5 so I now have a project to improve that.

The antenna analyser kit is $US54 for the full kit which is great value for money and the software is a free download. Like the AIM antenna analyser from Array Solutions, there is no display on the kitset, the analyser is powered and controlled from the PC via USB connection. The frequency range is 1 MHz to 35 MHz and the software displays Return Loss to 60 dB and the equivalent SWR. Markers can be added to the display and the mouse position shows as horizontal and vertical marker lines along with the relevant frequency, SWR and return loss. The unit is calibrated in the usual way for this type of instrument, first leaving the termination open and then using a short. I made a shorting BNC calibration plug by soldering the centre pin to the outside of the connector. Sweep can be the full band from 1 MHz to 35 MHz, set to individual ham bands, or any range you want. The number of frequency steps and the sweep time is set automatically as you change the sweep range but is also fully adjustable. The kit can also function as a signal generator although the output level is not adjustable. The software needs to restart every time a configuration setting is saved and this is a bit annoying, but not the end of the world. You can compare up to three sweep results and also save a table of results for future reference. The analyser uses a simple resistive bridge and lacks the ability to show the reactance of the antenna load or do distance to fault measurement, but is very handy for checking or adjusting your HF antennas and it is very cheap compared to similar instruments. βi

References

Fox Delta: <http://foxdelta.com>

Please QSL via eQSL.cc

by Graeme Jury ZL2APV

One of the components of a QSO since the beginning of Ham Radio has been the QSL. It has taken the form of a letter of confirmation, to a postcard, to the dedicated QSL card with which we are all familiar. In recent times the internet explosion has led to LOTW (Logbook of the World) and eQSL.cc becoming a primary method. To many hams the QSL is the completion of their QSO and to others is a means to gaining an award and yet others just a nuisance and of no interest. Participator or not the ubiquitous QSL will arrive on your doorstep sooner or later. This article is to familiarise the reader with eQSL.cc confirmations, their pros and cons and how to send and receive one.

An example of a received eQSL.

eQSL's are sent via the internet and of course are nearly instant and no cost. Probably you have eQSL's waiting for you from QSOs which may be years old so why not check now and see. Assuming you have never joined eQSL.cc, in your web browser, simply enter into the URL entry bar <http://www.eQSL.cc/QSLcard/Index.cfm> and below the picture of the globe displayed on the page is a box marked "Call-sign". Enter your call and click search and you will be taken to a screen which will state ZLnXXX is not registered yet and present a button "See if cards waiting" which when clicked will present a list of the eQSL's which have been sent to you.

Wow! There are a lot of cards there so how do I join so I can respond to them. You will notice a button on the bottom of the list of cards "Register me" which when clicked will take you through the registration process and allow you to retrieve and respond to your cards. It is very simple and free.

You should seriously consider becoming Authenticity Guaranteed

There is an additional optional step, again free, which is to become Authenticity Guaranteed and you should seriously consider this as it makes your card eligible to be used by its recipient for awards and even if your take on the hobby is not contesting or award chasing it is a huge amount of fun for many others who will value a ZL QSL. The eQSL.cc site has very good help for setting up (ref 1) and lots of good advice when you read the help section.

The eQSL card itself is a real card transmitted via the internet which you can store on your computer, leave in storage on the eQSL.cc website, print or display in an electronic photo frame etc. For your own card there are a set of stock cards on the site to which you can add your details which is available to all members or if you make a modest donation ($10 per year is reasonable) you get a bronze membership and can design your own custom card and this is a lot of fun in itself.

How does it stack up against paper QSL and Logbook of the World? As in a paper QSL if you receive a card which is not your QSO or wrong details you can create a fictitious matching QSO in your log and feel guilty about it for the rest of your life or you can contact the sender and sort it out. The fact is that DX stations don't just send out QSL's without getting a match from you so this rarely applies. The rest of it is pretty foolproof and it is nice to wind up with a displayable card.

Logbook of the World does not generate electronic QSL cards. It generates confirmations and keeps its security by operating blind. Both stations upload their QSO details and if there is a reasonable match you get the QSL. Unfortunately you have no way of knowing if there is no QSL whether the other station did not send one or there was an error like they used local time instead of GMT and the match failed. A small number of hams are a bit paranoiac about fake QSO's and a very good treatment of the eQSL vs paper criticisms is made in reference 2.

Many DXpeditions will not eQSL which is a great shame after all the effort and expense they went to to bring the rare DX to the world they then deny a section of hams from enjoying their aspect of the hobby when at absolutely no cost to themselves they could do so. A lot of contesters upload their log to eQSL.cc and LOTW, as a service to other participants who may also like to collect confirmed QSO's. They usually have no interest in collecting thousands of cards but recognise that others do and good on them for it. Most good logging programs like DXLab or Ham Radio de Luxe for Windows and CQRLog for Linux support a one button click to upload and download QSOs to LOTW and eQSL.cc and all that I know of support ADIF export which can be uploaded to eQSL.cc so sending your electronic log is very easy and quick after setting up.

EQSL.cc have an award system for 25, 50, 75 and 100 Countries plus all the zones and other of the usual style awards. The QSL's also qualify for CQ awards but not any ARRL awards which is a bit of a closed shop. Put some fun back into your hobby and collect eQSL's. It will bring a lot of pleasure to both you and your recipients.

References

1 <http://www.eQSL.cc/QSLcard/Presentation.cfm?Slide=Step1>
2 <http://www.eQSL.cc/QSLcard/eQSLWhitePaper.cfm>

FMTAG – Frequency Management and Technical Advisory Group

Secretary: Doug Ingham ZL2TAR
<fmtag@nzart.org.nz>

Proposals

None this time.

Final recommendations to NZART Council

Branch 49 Westland has applied to transfer its 6 metre beacon to Stafford, located at TOPO50 BU18 417747. The Branch has requested a change of transmit frequency to 50.055 MHz. The new frequency has been coordinated with Region 3 IARU. An engineering evaluation, in accordance with RSM document PIB38, confirms that there will be no interference to other stations.

Branch 49 Westland has applied to transfer its 2 metre beacon to Stafford, located at TOPO50 BU18 417747. The transmit frequency will be unchanged at 144.286 MHz. An engineering evaluation, in accordance with RSM document PIB38, confirms that there will be no interference to other stations.

ZL2WHO has applied for a beacon at Waipuna, located at TOPO50 BJ33 890298. The transmit frequency will be 432.271 MHz. The beacon will be co-located with the existing beacons on 50.024 MHz and 144.271 MHz.

Comments and Applications

Please send your comments and suggestions on the above, and on any other FMTAG matters, by e-mail to: <mtag@nzart.org.nz>

Applications for repeaters, beacons, digipeaters, point-to-point links, and so on, should be made on the latest version of FMTAG Form 10. The latest versions of FMTAG Form 10, and the explanatory Form 10A, are available on the NZART website: <http://www.nzart.org.nz/fmtag/index.html>

Completed forms should be sent by e-mail to <fmtag@nzart.org.nz>

The Australian Army Signals Museum

by Martyn Seay ZL3CK, OTC 1130

Located northeast of the Melbourne City Centre, this unusual and unique collection of military radios is easily accessible by public transport. Having a great interest in WW2 era radios, this museum was a "must see" for me when in Melbourne. I learnt of its existence from articles in the Australian Radio Amateurs Old Timers' Club Magazine, "OTN" (Old Timer's News). I have been receiving this excellent publication over a number of years. It features many articles relating to the war service activities of Australian Amateur 'Old Timers'.

I 'searched out' the website of the museum, and emailed for more information. I was delighted to receive a reply from Major Fiona Davis, the museum's director. Normally the museum is open to the public only on a Tuesday; unfortunately I was visiting over a weekend. But-no problem, she would be pleased to open it especially for me, and furthermore, offered to pick me up from my hotel!

The Army Signals (Sigs for short) Museum is located within a large army training establishment, the Simpson Barracks, in the suburbs of McLeod and Watsonia, about a 40 minute train ride from Flinders Street station on the Hurstbridge line. I enjoy train travel, and was more than happy to get there myself. On a Saturday, it will set you back the princely sum of $3.30 for the whole day of public transport! (But you need to purchase a "MYKI" card first).

After walking about 20 minutes I found the main entrance on Greensborough Road and the guardhouse. With some fast talking to the guard, presenting the emails and photo ID (NZ driver's license) I was directed to Fiona who whisked us through the barrack grounds to the museum. The museum building is an old 1960's satellite communications base establishment where one can still just see the outline of graffiti from protests 20 years ago on the wall! Fiona said she'd like to repaint them because it looked more interesting before the paint faded!

After a short look around the entrance we had a look in the storage area of the museum, which was the generator and service area of the "spy base". Much of the equipment is still there. However it was the piles of No.19 sets that gobsmacked me as we prowled around! Fiona said they receive donations of radio collections and are becoming embarrassed for storage space. (I naturally offered to "help out" by taking a few home, but unfortunately as the items are donated for museum purposes she couldn't accept my "kind" request!).

Then we progressed to the main display area, which is well set out in chronological order, with various army unit flags and insignias on the surrounding walls. The radios that I found most interesting were the WW1 aircraft spark transmitter (they didn't bother with a receiver), a rare Japanese field radio using only one valve for both transmitter and receiver, and a couple of WW2 "suitcase" spy radios. Also a German WW2 Feldenschreiber transmitter, which must be rather rare too!

Around into the second room is found a WW2 5 kW transmitter, which was in service at Digger's Rest base until the 1960's, and a 1 kW linear amp for mounting on a jeep or truck.

Here is also a comprehensive library for those wanting information, manuals and other articles relating to Army radios in the collection. Fiona said there have been many donations from veterans and radio amateurs' collections, and she expects more in the future as they/we become silent keys…

The radio collection also includes; No's 11, 19, 108, 208 Mk 1 & 2, 101, 88, Kingsley radio (Melbourne), HRO look-alike receivers, BC611, the Jap model 94 (there's an article in 'OTN' on this radio), WW1 spark transmitter Suitcase radios type A Mk3 and Type 3 Mk2, an Excelsior dispatch motorcycle, a reconstruction of a radio hut at Tobruk, RCA TE435 5 kW Tx, and "Charlie", the carrier pigeon who won the bird's equivalent of the VC.

I was interested to note they did not have either a ZC1 or a No.48 set, but presumably the Australian Army did not use these, or I feel sure they would be there.

Inside the Army Sigs Museum, Simpson Barracks, Melbourne.

Heavy Metal! 5 kW Transmitter in service at Diggers Rest from 1942 until 1960's.

Clandestine spy radio WW2.

As an aside, there were brochures from several other radio and military museums including the Kurrajong radio museum, Civil Aviation Historical Society Airways Museum at Essendon airport and, for the tank fans, the RAAC Memorial and Army Tank Museum at Puckapunyal. They all look very interesting, and there is plenty of information on the net.

So it was a very worthwhile visit, Major Davis made me very welcome, and I can thoroughly recommend a visit there if you are in Melbourne. βi

Editor's comment; *I have also visited this museum and can thoroughly recommend it.* *John ZL3IB*

How to spot a ham radio Internet rat

by Andrew Barron ZL3DW

Many years ago my father gave me some great advice, "if it seems too good to be true… it probably is". These days, with the advent of online shopping that warning is still valid, maybe more so. I regularly buy ham equipment on the Internet and I don't want to discourage anyone from doing that, but there are some traps to be avoided. There are many people making their living from Internet fraud so you need to be very careful before sending your money away. A few quick checks could save you from disappointment, lost cash and some embarrassment. I find that there are many people in faraway places very willing to send me millions of dollars from Nigeria, banks I don't use often need me to update my confidential password details and of course I regularly win $10,000,000 or more in non-existent lotteries. These scams are fairly easy to spot, but even so many people are fooled by them every day. Less obvious, are very convincing advertisements for used amateur radio equipment, often at great prices. These may include accurate descriptions and photos of the equipment, a realistic call-sign that checks out on QRZ.com and the offer of a safe way to transfer the money. So here is my story and a few tips that could stop you getting burnt by a scammer.

Generally buying from a reputable dealer in Europe or the USA will be fine. I have had no trouble importing from a dealer in China either. I would be remiss if I did not point out that buying from overseas dealers will mean that the equipment will have to be freighted back to the overseas dealer for warranty support. The local dealers and local offices of the manufacturer will not support equipment purchased off shore. This is one of the risks you take when you import equipment. Another thing that you must take into account is that you will have to pay GST on any import with a value including freight costs of more than NZ$400. So check the pricing and availability from your local dealer before buying from overseas, it may be that the lack of warranty support, the price including freight and GST, the risks and the delay due to freight time makes buying locally a better option.

If you do decide to import equipment, it is not a bad idea to ask around the club if anyone else has used the same dealer. If you are buying from a dealer in Europe make sure they take the VAT off the price, there is no point paying two lots of tax. Buying from individuals or dealers advertising on TradeMe® is usually OK since you can check details and their feedback. But you still need to be careful to make sure you know who you are dealing with. Buying from individuals advertising on EBay® or ham radio trading sites is riskier and buying from overseas classified advertising sites is exceptionally risky and is not recommended. Note that many Americans advertising on Ebay and some US dealers will not send equipment overseas, so check before you buy or bid.

So here is my story. I am in the market for a linear amplifier but the budget is tight, so I have been cruising the Internet looking for the best value for money. Imagine my amazement when I found an online advertisement for a complete set of Elecraft™ equipment, including a K3 transceiver, 500 W KPA-500 linear amp, and Panadapter spectrum display for only $US1600.00. The advert showed several photos of the gear on a typical ham shack desk and mentioned some upgrade options. The website was a classified advertising site in Atlanta, Georgia. That advert has been removed now, but the same ad is currently on what seems to be a Spanish language web site in Miami; <http://miamiclasificados.univision.com/ElectronicsForSale/1600-complete-elecraft-k-line-k3-p3-kpa500-linear-amplifier-all-factory-built/19013944.>

I smelt a rat, but thought I would check it out anyway, after all a bargain is a bargain, but now I am 100% sure it is a scam. I emailed the vendor and asked for details including the serial numbers and their ham call-sign, I asked the cost of freight and suggested payment by PayPal. This is the email I received back.

"*Thank you for your email. I am glad that you want to buy my Complete Elecraft K-Line K3, P3, KPA500 Linear and the price I am asking is US $1600.00. From the start I want to inform you that I left the USA a couple of days ago (next day after I listed this for sale) and I came in United Kingdom with my work (I am a member of the "Save The Children Foundation"). If you still want to buy it, we can do it in a very safe way using an escrow company. They will handle the delivery and will offer you a number of days of inspection so you can test and see that the merchandise is exactly as described by me. I will pay all shipping/escrow fees.*"

This reply set off a number of alarms and I immediately sent back an email stating that I had changed my mind and no longer wanted to buy the equipment.

So what are the issues? Firstly it breaks the "if something seems too good to be true" rule, more than $4700 worth of equipment for $1600. Also it was not advertised on EBay or ham radio trading sites which would be more logical for a genuine seller. The photos and accurate description of the equipment can be easily copied from genuine online advertisements. The email he sent me reads OK, but there are several danger signs. He failed to supply the information I requested; serial numbers which can indicate that the equipment really exists and his call-sign. He has left the USA and "came in United Kingdom"; bad English is not in itself a problem, just look at 90% of ads on TradeMe, but it is another indicator. Also it means that he has no verifiable address and supplies an excuse for delaying tactics. I read of another ham radio scam where this technique was used along with identity theft of an English ham operator. In that case after receiving the money he said that the equipment was still in the USA and that he was arranging for a friend to send it. Then it was the friend had made a mistake; then the replies to emails stopped! Finally there is the offer of using a safe method of escrow to handle the financial transfer. This was new to me but apparently escrow is used extensively in Europe for Internet purchases. It works by a finance company providing a conduit for the money and not paying the supplier until the goods have been received by the customer. The scammer creates a false escrow company web site and you will note that he has volunteered to handle all shipping and escrow fees, so I would not need to contact the escrow company myself.

Always ask for a call-sign. If a call-sign is supplied, you can check the contact details on a call-sign database like QRZ.com. If the email on QRZ is different to the one on the advertisement you can send an email to it and see if you get a reply from the same person. Gmail, hotmail and yahoo email addresses could be anyone. For high value items ask for a phone number and give them a call, have a chat and see how genuine they sound and how knowledgeable they are about the gear they are selling and the hobby in general, have a chat about band conditions, sunspots or propagation. You don't have to sound suspicious or be confrontational. If QRZ is linked to a web site you could ask a technical question relating to something on the website or just what kind of dog is in the photo. It is reasonable to ask for serial numbers. Often you can use the information to tell the date of manufacture using information on the Internet and if the serial number should be in a particular format it is a dead giveaway if the proposed supplier supplies something that looks totally different. I would not be inclined to buy equipment if the vendor refuses to supply serial numbers. It is an indicator that something is wrong about the deal, maybe there is a scam or possibly the equipment is stolen property. Payment by Western Union is definitely out. There is no protection at all it is simply a money transfer with no guarantee that the vendor will ever send you the goods and it is a favourite for scammers. Be very cautious of using Money Orders and Cashier's Checks. PayPal® and Credit

Satellite Orbits

Andrew Barron ZL3DW
<ad.barron@xtra.co.nz>

Welcome to the 40th edition of Satellite orbits! Would anyone more active on satellites like to take on writing this column? Let me know!

Another two LEO satellites are now available for ham QSOs. At 0413 UT on Friday, April 26 two amateur radio CubeSats were launched from the Jiuquan Space Centre. TURKSAT-3USAT is a 3U CubeSat (10x10x30cm) which carries a 145 to 435 MHz linear transponder built by the Turkish TAMSAT / AMSAT-TR group for SSB and CW communications.

- CW Beacon: 437.225 MHz
- Uplink: 145.940 to 145.990 MHz
- Downlink: 435.200 to 435.250 MHz

Further details at <http://amsat-uk.org/satellites/turksat-3usat/>

The Argentine CubeBug-1 is a 2U CubeSat (10x10x20cm) and has a 1W AX.25 packet radio digipeater. It operates on 437.445 MHz using 1200 bps AX.25 AFSK FM packet radio – call-sign LU1VZ-11. Further details at <http://amsat-uk.org/satellites/cubebug-1/>. Depending on the mode of the satellite the beacons will be transmitted every 10 to 30 seconds. Telemetry information is at <http://1.cubebug.org/coms/telemetry>. The team say "Please, if you hear the satellite, lets as know by email to <cubebug1@satellogic.com>. If you decode a beacon or save its audio, please share it with us!". After the technology demonstration part of the mission is over, the satellite will enter a mode that will include services to the Amateur radio community, including an AX.25 Packet Radio Digipeater, science data downloads from the payload (including images if possible).

NEE-01 Pegasus built in Ecuador was on the same launch. It operates on 910 MHz (an amateur band in some countries). It's downlink is either a 0.9 W output 720p HD TV transmitter or a beacon which will send a Morse Code ID, followed by a SSTV image and Ecuador's national anthem. See <http://www.earthcam.com/world/ecuador/ecsa/>

Three amateur radio PhoneSat CubeSats known as Alexander, Graham and Bell were launched on an Orbital Sciences Corporation Antares rocket from NASA's Wallops Flight Facility in eastern Virginia on Sunday, April 21. The three PhoneSats carry amateur radio payloads on 437.425 MHz. Each satellite transmits at different intervals so all three are receivable during a pass. The call-sign of all three satellites is KJ6KRW and they transmit AX.25 packet radio using AFSK (1200 bps) modulation. Alexander transmits every 25 seconds, Graham transmits every 28 seconds and Bell transmits every 30 seconds.

The OSSI-1, Dove2, BeeSat-2, BeeSat-3 and SOMP CubeSats carrying amateur radio payloads were also launched on Sunday, April 21 from pod launchers on the Bion-M1 spacecraft. The Cube Sat deployment was delayed until the spacecraft had achieved a circular orbit at 575 km altitude. OSSI-1 carries a 12 wpm CW Morse code beacon on 145.980 MHz, a data communications transceiver on 437.525 MHz and carries a 44 W LED optical beacon to flash Morse code messages to observers on Earth. The others have 70 cm downlinks for technical data.

What was given up as dead has turned out to be alive! India's first IIT-made student satellite, Jugnu, a 3 kg satellite produced by the students and staff of IIT-Kanpur, was found to be working more than a year after the control team had given it up as dead and stopped tracking it. While its signals are reported as still strong, some of its internal functions have weakened.

LituanicaSAT-1 is scheduled to be delivered to the International Space Station (ISS) on the SpaceX CRS-3 mission towards the end of 2013 to be deployed from the ISS by the JEM Small Satellite Orbital Deployer. The satellite will use low cost open-source software and hardware for primary and secondary flight computers that will control the payload consisting of an onboard VGA camera, GPS receiver, UHF CW beacon 100 mW, 9k6 AX25 FSK telemetry TX 2 W and a 150 mW FM V/U mode transponder for voice.

As always I am keen to hear about and publish details about your satellite activities, so please drop me an email to <zl3dw@nzart.org.nz> and photos are especially useful. I am also very happy to answer any questions that have you puzzled or will help you get started.

73, *de Andrew ZL3DW*

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Cards seem to be the best option as far as having any buyer protection. Money Orders and Cashier's Checks are perfectly acceptable once you are absolutely sure who you are dealing with. Always ask the vendor to use a freight service with a tracking function so that you can see where your parcel is.

The escrow option is OK but you should always independently verify that the company is genuine by checking the web site and contacting the escrow company direct rather than using any links on the web site suggested by the vendor. If the company is legitimate it should have a complete web site not just a single page. If you really want to make sure, call them on the phone. False web sites are another favourite for scam artists. On any web site sent to you by email hover the mouse over any links on the page and note the address displayed at the bottom of the screen. It should be consistent with the web site 'domain' and not include odd country codes, or words like Lycos, gmail, Hotmail or yahoo. Never click on the links, go to the web page using your Internet browser. The 'real' site should look the same and have the same links. Personally I never ever use links on web pages sent via email. I always go to the Internet site and then click the links from there.

My Elecraft vendor refused the PayPal option and offered free freight and to pay the escrow fees. That would seriously erode the $1600 for the equipment and is pretty unlikely from a genuine seller, especially since I didn't ask for it. He didn't supply the checking information I requested and does not have a verifiable address.

Here are a few examples I found on the Web. "*Beware There is a scammer who goes by the name and call-sign of Fred Rice G7LPP in London England UK. He scammed me by offering to sell amateur equipment and wanted funds sent via Western Union. After partial payment was sent to him, he claimed he did not get money. Western Union verified via signature and ID he picked up money and used ID with Fred Rice's name. Beware, he is a confirmed scammer*". *Note the use of Western Union. Here is another; "the one used to impersonate me was arg7kpfgayne@gmail.com*". Note the use of a plausible but made up email address. This next one sounds a lot like my Elecraft guy, "*Some recent ads on VKClassifieds.com.au have looked very attractive. Some Icom and Kenwood high value gear (TS950Sdx and IC756 pro3) being offered at about 1/2 to 2/3 of its typical price in Australia. An email enquiry to the seller, calling himself Donald [name withheld] of Wilmington Illinois USA and using an email address that looks like a call-sign plus the numerals 73, returned some telltale responses. He asked for payments via Western Union and UPS delivery. And he used some odd English constructions in his wording*". Common factors are; Western Union, made up but plausible email address, odd use of English phrasing and bargain prices.

99% of hams are genuine decent fellows and almost all overseas trades are just fine, just remember to verify that the person you are dealing with is genuine before parting with your hard earned cash. It is probably better to miss out on the bargain of the century than lose the money. Not that this worries me anymore because I can now afford to buy anything I want…my friend the nephew of the King of Senegal is just about to send me a heap of cash. βi

73, *Andrew ZL3DW*

Additional 2012 Annual Reports

The following annual reports were received too late for inclusion in the March/April issue of Break-In

Frequency Management and Technical Advisory Group (FMTAG) 2012 Annual Report

FMTAG has worked steadily throughout 2012 providing advice and guidance on licensing matters, to Council and members, and assisted the Administration Liaison Officer in his dealings with Radio spectrum Management (RSM).

We have also held successful negotiations with other Government agencies for Amateur access to non-Amateur spectrum, with a good outcome in all cases including: FM repeater outputs at 53 to 54 MHz and Digital TV repeaters at 502 to 510 MHz.

We have answered many technical and licensing queries from both NZART branches and individual members. Our streamlined procedure for licence applications, introduced in 2009, is working well, with most applications proceeding to the granting of licences in under a month.

The usual work with repeaters and beacons has continued. There are now 302 Amateur repeaters, beacons and links registered on the RSM licensing data base. 54 licences were renewed during the year, on behalf of Branches, for an administration fee of $5.11 per licence.

21 repeater, beacon and link licence applications were investigated, crafted and certified in accordance with the RSM's Radio Licensing Certification Rules (also known as PIB38), during the year, at a saving to NZART members of $7,536 in RSM Engineering Certification fees.

Most Branches have now transferred their STSP repeaters to the single All New Zealand Short Term Special Purpose repeater licence, with savings to the Branch of $46 per annum for each individual STSP licence relinquished. Please refer to RSM Licence 209732 and to page 7 of March/April 2008 *Break-In*, for the terms and conditions of the STSP licence.

The third version of the RSM's Spectrum Management And Registration Technology (SMART 3) licensing system, introduced in early 2009, is still providing surprises. These usually appear following the (approximately) monthly software upgrades.

A new bug appeared at the beginning of November 2012, which affected the renewal of 99 Licences. Two new bugs were discovered during the licensing of the first 502 MHz to 510 MHz Digital Amateur Television licence. The RSM appreciates our testing of, and reporting on, the performance of the software that it uses!

My thanks go to the many NZART members who have assisted FMTAG during 2012. Finally, my thanks also go to Doug, ZL2TAR, John, ZL2HD, and Terry, ZL4TAE, for their valuable support and advice during the year.

David Andrews, ZL2SX, Chairman FMTAG.

Local Government Liaison Officer Annual Report 2011

As for 2010, district plan changes and reviews were the main activities in local government liaison.

An interim decision was received from the Environment Court on the appeal against the decision of Wellington City Council to limit permitted use of lattice masts to the residential building envelope maximum heights of 8 metres and 10 metres (for the outer and inner residential zones respectively) A subsequent memorandum from the Court is still under consideration.

The appeal to the Environment Court on the 2011 decision of Tauranga City Council on the NZART and local branch's submissions opposing proposed rules in the District Plan review could not be resolved by mediation, and was heard at a full court hearing in May. The appeal was successful and gained for Tauranga amateurs the permitted use right to erect a primary mast to 20 metres height and a secondary mast and supporting poles to 9 metres. The strength of this precedent for other Districts is uncertain, but all branches should seek to attain similar rules.

A hearing at Rangitikei District was attended, seeking reasonable rules, and decision made by the Council was favourable in all aspects except the limitation of height to 15 metres.

Submissions were made to Waipa District Council opposing their proposed district plan rules limiting amateur radio antenna installations, to Marlborough District Council on a similar proposed plan change, and to Wanganui District opposing a proposed reduction in amateur dish antenna sizes.

Advice was given to several members on aspects of planning and on interactions with local authorities.

With the power level of amateur stations having been increased to one kilowatt, it is a matter of concern there is the potential for emissions in urban installations to exceed the radiofrequency field compliance levels of the New Zealand Standard NZS2772. Operators should be capable of evaluating their own installations, and hold documentation to be available to verify compliance to district councils against accusations from vexatious neighbours. Branches have a role to play in training members in evaluation.

I re-iterate the concluding paragraph from the 2011 report, in which I wrote 'This report serves as a reminder to actively oppose inappropriate rules, since once a district plan is finalised it becomes the governing document for the next 10 years, and leaves no avenue for recourse'.

Mike Newman, ZL1BNB, Local Government Liaison Officer

New Members

Name	*City/Town*	*Branch*	*Call-sign*
S B Penlington	Auckland	2	ZL2ITT
A Combrink	New Brighton	5	ZL3AGC
M Bouma	Kaiapoi	5	ZL3JUP
J W Barrow	Rangiora	68	ZL3FLY
H Seko	Auckland	2	ZL2XX
J S Townsend	Christchurch	5	ZL3TTJ
W R Pitter	Dargaville	28	ZL1WRP
A H J Burns	Auckland	2	ZL1AHJ
H K Ironside	Tauranga	88	ZL1ETA
D M Allen	Tauranga	88	ZL1WIN
M J Pannell	Christchurch	5	ZL3PM
J Aubrey de Lavenu	Hastings	13	ZL1CQO
Nicholas McEvoy	Invercargill	8	ZL4NB
P Broughton	Kaitaia	28	ZL1TWT

WANTED: copy for *Break-In*

My stock of articles etc for future issues is running low so I appeal to members to assist with material for publication. This could be short or long articles on any topic related to amateur radio and electronics, constructional articles, book reviews, equipment reviews, software reviews, branch activity reports, etc.

I should also like to receive articles on electronics related topics such as auto-electronics, home sound systems, workshop practice; in fact anything that hams might find of interest. Thanks and 73, *John R L Walker ZL3IB (Editor)*

Email <zl2tw@nzart.org.nz>

Financial statement; p1 of 8

(Unfortunately this page was omitted from the 2012 Annual Reports)

NEW ZEALAND ASSOCIATION OF RADIO TRANSMITTERS Inc

Income and Expenditure for the Year Ended 31 December 2012

2011		Note		2012
	Income			
118,606	Subscriptions	1		124,030
10,749	Interest and Investment Income			9,413
560	Donations Received			6,849
6,722	SMART Processing			6,926
83	Examinations	3		-
747	Publications	2		188
137,467	**Total Income**			**147,406**
	Less Operating Expenses			
59,080	HQ Operating Costs	4	69,232	
1,950	Audit Fee		1,995	
1,688	Beacon & National System Costs		283	
-	Branch Visits		-	
46,532	Break-In and Call Book	5	65,344	
9,287	Conference		9,857	
312	Contests, Grants and Gifts		-	
2,575	Council Expenses		817	
2,036	Election's		-	
1,414	IARU Region 3 Contribution		1,677	
1,600	Legal Expenses		444	
2,607	Repeater Licence Costs		1,528	
-	Membership Promotion		627	
(5)	Officers Expenses not covered elsewhere		-	
-	Overseas Travel		17,344	
1,674	QSL Bureau Costs		2,373	
512	Website		365	
131,262	**Total Expenses**			**171,888**
6,205	**Excess INCOME over Expenditure for the Year ended 31 December 2012**			**(24,482)**
2,429	Taxation Expense			2,092
$ 3,776	**Excess INCOME over Expenditure transferred to Accumulated Funds**			**$ (26,574)**

The attached notes form part of, and are to be read in conjunction with, these financial statements.

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XYL calling ZL1HAM: "If you don't 73 and come and E-A-T PDQ you'll C-O-P it!"

(Break-In, Nov 1957)

The Morseman

Gary Bold ZL1AN
<morseman@nzart.org.nz>

Morse in Space?

A questioner asked "was Morse code used in the early US space missions?" It's never mentioned in popular accounts, but Morse transmission capability was provided on all Apollo missions as an "if all else fails" mode. It never had to be used, although the "backup voice" mode was used on the Apollo 7 flight and the Apollo 16 lunar module due, apparently, to a "failed high-gain antenna".

A toggle switch on the command module's control panel, shown in figure 1, enabled this morse mode. It will be difficult to discern when reduced in this column, but the switch is at co-ordinates Z (left axis) 106 (top axis) in the figure. This gives some idea of the complexity of the instrumentation the astronauts had to master.

No Morse key was provided. Morse was to have been keyed using the "press to talk" button (labelled "Xmit") on the communication interface called the "Cobra head" (because of its appearance) shown in figure 2. The bottom connector plugs into the spacesuit, the upper to a cable which carried communications, biomedical signals and warning tones. The Apollo 7 log states that a 7 minute "Morse code emergency test" was conducted on 19 October, 1968. A "press to talk" button is a somewhat primitive key, but then, they never expected it to be used, and this test was apparently the only one made.

But several of the astronauts were radio Hams, and all had some knowledge of Morse. I met one of them, Tony England, in 1992 when conducting research at the University of Michigan. At that time Tony had left the space program and was a professor in the Electrical Engineering School. In 1985 Tony had been in orbit on a shuttle mission, and had planned to contact Scout groups during his recreational time as a way of involving young people in the space program. However, when sked time came, Tony was deeply involved in experiments, and had only time to transmit a brief morse message expressing his regret. I emailed Tony to ask if he had any recollection of this, and he replied:

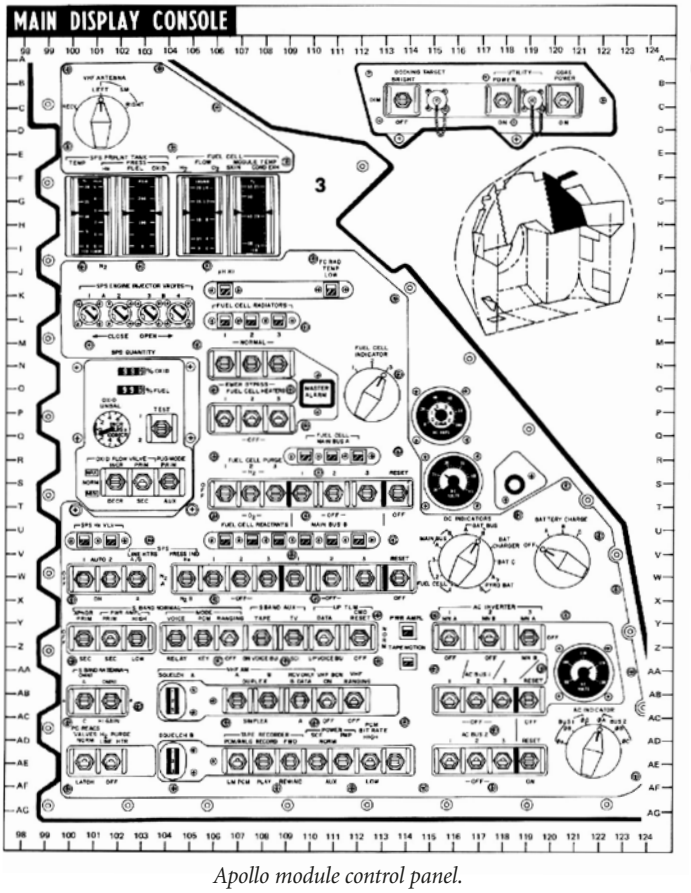
"It has been so long since my flight I really do not remember if I used any code. The rig was FM and slow-scan TV. I don't remember that we had a CW mode. Among our crew, I knew code best but four of us were pilots and would have had some facility with code through that experience, and, as you know, others on our crew did earn amateur licenses so that they could participate in SAREX. I don't know whether any of them stayed with it as a hobby after the flight."

Well, that was 28 years ago, in another life, so I wasn't surprised that Tony's memories were dim. I met another astronaut, Harrison Schmidt, who piloted the last lunar module to visit the moon in December 1972. In 1973, NASA sent him on a world tour to publicize the space program, and I was in the official party taking him to lunch in the Auckland University common room after his public talk. When Harrison discovered that we were both keen squash players, we spent most of lunchtime discussing differences between the US and English versions of the game. I don't recall asking him any questions about the space program at all, and now I wonder why.

Harrison completed a PhD in Geology before joining the space program, and was one of the few trained scientists who visited the moon. In fact, he was the last man to step off the moon on the last mission to it. He claims to have taken the famous photo of the earth from space, "The blue marble" on the way out. You can find it with Google.

Eavesdropping on the Moon

Neil Armstrong and Buzz Aldrin were the first to land on the Moon in the Apollo 11 module, on 20 July 1969. Because of the immense media sensation this triggered (almost everybody over 50 can recall listening and watching the video footage) it passed virtually un-noticed that a US Ham, Larry Baysinger, W4EJA, copied the transmissions from that first moonwalk directly from their back-pack VHF-AM radios!



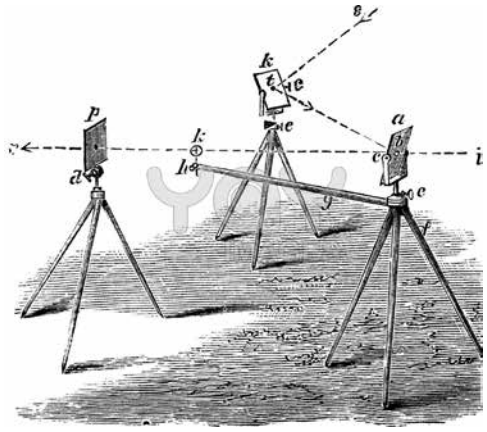
Apollo module control panel.

This feat was recently brought to light by Chris Graney, a professor of astronomy in Louisville, Kentucky. Chris's web-page[1] recounts how Larry had home-brewed equipment for tracking weather satellites and printing crude pictures; this was in the days of dot-matrix printers, and decided to see if he could eavesdrop directly on the astronaut's un-edited conversations. One of his objectives was to see if NASA edited anything out of their transmissions relayed to the public; he reported that they didn't.

Larry was using a rotatable antenna with two 6 ft by 6 ft chicken-wire corner-reflector elements. On the night of the first moonwalk he and a friend, Glen Rutherford, aimed it by eye at the moon, and recorded noisy but reasonably intelligible conversations between the astronauts, probably (recollections are now unclear) on a frequency of 259.7 MHz. Glen was assistant Editor of the local newspaper, and published a story, with photos, about this in the July 23 edition.

In 2009 Chris discovered that Larry had recorded these conversations on analogue tape, which, after 40 years, still played back! He digitized them, and gives links to six of them on his web-page. They are noisy and probably degraded by time, but you can still make out the voices, in one conversation the astronauts talk to President Nixon,

The "Cobra head" connector with "XMIT" switch at bottom.



Begbie heliograph with second mirror in use.

in others, comment on visibility, colour and temperature.

Larry and Chris were interviewed on "*Space Ham*" a BBC Radio 3 production of 19 January 2013[2]. They discuss how the signals were received 5-10 seconds earlier than transmitted on the NASA TV program which their families were watching, and how they had to periodically re-orient the antenna to track the moon's movement. Since the moon was low in the sky, receptions showed slow fading, interference between the direct and reflected paths, and finally vanished when the moon set. Opinions differ on the backpack transmitter's power level, but it was probably about 5-10 Watt. This must hold the distance record, 384 000 km, for receiving a low-powered S-band voice transmission!

The Heliograph

This was used extensively in the 19th and early 20th centuries for military optical Morse code communication, particularly by both the Boers and British in the Boer War. An English electrical engineer, Henry Mance, designed the first practical one in 1869 by adapting an idea proposed by Gauss in 1810 for use in geodetic surveying. Using the sun as an optical source gave beam intensities far higher than obtainable using lanterns, and enabled reliable communication in daylight.

Figure 3 shows a public-domain image of an early American Begbie Heliograph. To set it up, the operator looked through a small hole in the centre of the mirror marked "a" at the cross-hairs at the end of the horizontal rod, sighting it at the distant receiving station, then adjusted the angle of this mirror to reflect upon it the image of the sun. If the sun was behind the sending direction, a second mirror, marked "k", was used to bring it into view. The screen marked "p" was then placed in the path of the beam. A lever at its base, marked "d", then acted as the key, turned by the operator to expose or mask the beam. The beam path is shown by the dashed line.

This was a cumbersome instrument, and required at least two men to set up and operate. Later models were much smaller and lighter, typically had circular mirrors, and mounted on a single tripod. Google finds many images of later heliographs, but none suitable for reproduction here. In these, the cumbersome keying screen was replaced by a simple hinged mechanism on the primary mirror which deflected the beam upwards, away from the target – if deflected downwards, it had been found that the enemy, in an intermediate valley, night read and decipher the "negative Morse" sent.

Sending speeds were slow by CW standards, 8-15 wpm, since a fair chunk of metal had to be moved by somewhat clumsy levers. This didn't matter, since reading fast optical Morse is much more difficult than reading audio Morse. Try it. A rough rule was that the useable range was "ten miles per inch of mirror diameter", and signals were usually read with binoculars. The projected sunlight beam was narrow, typically illuminating a circular area of "50 feet per mile of range", and the mirror system had to be constantly re-aligned as the sun moved. Heliographs were also used from ships, but since they tossed about a fair bit, diffusing screens were usually placed in the beam path to broaden it. On land, in clear air, operational ranges of 50 miles were common, and over 100 miles was occasionally reported between mountain-tops.

Heliographs were supplied to the Australian and British armies until the 1960's, as they were considered to enable "low probability of interception" communication, and Afghan forces used them in the 1980's during the Soviet invasion. The Royal Signals website[3] has an excellent account of their history and use..

Another kitset

jon, EA2SN, has sent me a link[4] describing a simple transceiver using the NE602 IC. This is built from a kitset, and operates either on 40 or 20 m, with an output power of 4-5 W. This has been constructed by a number of European Hams in a "Buildathon", and gets glowing performance reports. Complete parts lists, photos, and constructional details are given on jon's website, which also has links to sound-card and crystal testing methods.

Corrections

George ZL2AG wrote that he has built a number of reflex receivers using the circuit shown as figure 3 in the last column. His experience is that 400 pF, not 1 nF would be better across the secondary of transformer T3, for better high frequency audio response, and the secondary of T2 can be tuned. The fixed resistor Rd can be a potentiometer, and used as a volume control.

Last month's problem

Why was 6.3V chosen as the filament voltage for tubes, except for that of the rectifier, which was 5V? And why was the rectifier "directly heated", with no separate cathode, whereas the other tubes were "indirectly heated"?

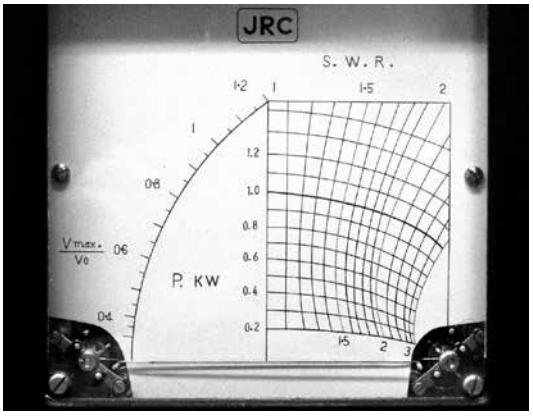
Interesting answers came from Ron, ZL1AI, Basil ZL1TOW, Joe VE7BFK, George ZL2AG and Ross ZL3TFK, and a variety of opinion is expressed on the web. In summary, 6.3V was used because it was the voltage provided by 3 lead-acid cells, commonly used to supply the larger currents needed by battery sets. Rectifiers were directly heated because for a given filament current, greater emission efficiency results, and the filament also comes up to operating temperature faster, giving a "soft start". There is diversity of opinion on why 5V was chosen, but a major one is this:

If the same filament voltage was used for all tubes, it would be tempting to also use the same filament transformer winding for all. But a directly heated rectifier has the full plate voltage appearing on its heater, which is insulated to withstand it. If this high voltage appeared on the other filaments as well, it could cause their heater-cathode insulation to break down. Hence a separate, isolated transformer winding should be used for the rectifier filament, having a different operating voltage, 5V, to make its use obvious. There were rectifiers (6X4, 6X5) which had indirectly heated 6.3V filaments which could be run from the same winding as the other tubes, but vintage radio gurus say that these were prone to shorting, and were limited to supplying about 70 mA.

This Month's Problem

The Musick Memorial Radio Station is on a peninsula near Auckland. It was commissioned in 1942 to act as a maritime and aviation communication centre, with call-signs

continued on page 18



JRC transmitter SWR meter at Musick Point.

Around the Branches

Branch 69 operated in the QRP section with solar power at the Otaki Airstrip. (Photo by Kevin Henderson).

Kapiti Amateur Radio Society Branch 69

Branch 69 operated in the QRP section with solar power. We were at the Otaki Airstrip, a private airfield with grass runway and an alternative to Paraparaumu for light aircraft. We used the Branch call ZL2KB. I think all Branches should use their own call. ZL2G appeared again and I thought these were issued for only short term use? We used my Elecraft K3 for CW with full break-in and a FT2000 for SSB. The antenna was a centre-fed dipole in an inverted vee configuration with centre at 8 metres. The solar panel was a 75 W version. We had an enjoyable weekend and the location was very quite with only electric fences clicking away but easily dealt with by the noise blanker. The Emergency Caravan was checked out and we have a list of improvements to do. We could only operate 11 hours out of the 18 due to lack of operators but we did OK with 5 W. ZL1VD and I handled the CW; we are getting as rare as rocking horse droppings.

73, *Max Kempson ZL4VV*

Upper Hutt Branch 63
Special IRLP Event: Sunday 17 March 8.30 am on IRLP Node 6931

In 2003, the Mayor of Upper Hutt Wayne Guppy, and then current President of NZART Peter Norden ZL2SJ and members of Upper Hutt Branch 63 NZART celebrated with Wellington Florida's city councilor Bob Margolis the anniversary of the founding of Wellington Florida's Emergency Communications Management Centre. This link up was done via IRLP a VOIP linking system. The two men exchanged greetings and best wishes to each other over a period of some thirty minutes. Both were amazed at the technology involved the various matters in common they both had.

This year 2013, Wellington Florida's Amateur Radio Club again made contact with Upper Hutt Branch 63 to again renew this communication, but this time with the mayors of Wellington, Florida and Wellington, New Zealand. Bob Margolis now mayor of Wellington, Florida and Wellington's mayor Celica Wade-Brown were due to have a similar link up to the one described above. However due to a scheduling conflict Mayor Wade-Brown had to decline the request with a week to go.

Larry Lazar KS4NB President of the Wellington Radio Club (Florida) made contact with President of Upper Hutt Branch 63 to request assistance to arrange an alternative to for Mayor Wade-Brown. It was thought that ten years after their first contact the two Mayors from Wellington Florida and Upper Hutt would like to renew their friendship.

Upper Hutt Branch 63 readily offered to step in and make this QSO happen. The event went ahead on Sunday 17 March 8.30 am. via IRLP Node 6931 on the Mt Climie 730 VHF Repeater.

Both mayors again exchanging greetings and Mayor Guppy relived this time in America where he studied for his PhD at the University of Nebraska commenting on the recent poor performance of his beloved American Football team from the university. The team is known by its nickname the Cornhuskers and has fallen on hard times but he is hoping that it will return and perform better in the future. Comments were also given about the status of the drought here in New Zealand, which Mayor Margolis stated that they too had similar events and wished all Wellingtonians good luck for rain in the near future. Oddly enough the rain started just after the QSO finished so perhaps the 'rain gods' were listening.

Within fifteen minutes it was all over and the node and repeater were returned to normal operation.

I'd like to thank Larry, and both mayors for making the effort to be involved in the event, and making it such a success, and to also thank Wellington Branch 50 NZART and current NZART President Vaughan Henderson ZL1TGC for their assistance in the early planning stages.

We all hope to be around in another ten years to perhaps repeat the link up and who knows via what technology amateur radio will have explored at that time.

Mark Gooding, President, Upper Hutt Branch 63 NZART

Musick Point Radio Group Inc, Branch 86,
Native CW

At branch 86 we have had trouble finding new members willing to learn CW. Around Christmas time we thought we may have found a new club recruit. Being of a very nomadic nature, this chap could never settle as he had been around many of the branches.

He was very keen to learn but had difficulty with the basics. His problem with CW was counting. This was evident with his sending. When trying to send the letter V it came out as the number four; four dots instead of three, before the dash.

He had two other pastimes which he thoroughly enjoyed. One was flying and the other was singing. For the latter he was never off key which made me think he would be an ideal candidate for CW.

As for his flying skills we assumed them to be good but on one occasion he came close to disaster after a navigational error. Whilst waiting for him to become a radio club financial member all we ever saw was a small deposit.

This made me more determined, so I then decided to try another approach. Perhaps he was a little deaf, after all he was getting on in years. Because of his nature, wearing a hearing aid was never an option. Headphones were not practical either. That left only one alternative, a very loud audio morse oscillator. The plan was to send CW to him. Most of the morning was spent building the device. A horn speaker was even purchased for the task.

All this was to no avail however. The next time I went to the clubrooms he did not arrive. The following week the same. Time passed and he never showed.

Perhaps he will return next summer when the Kowhai and Pohutukawa flowers bloom. If anybody sees him we would like to know. His most distinguishing characteristic is the white feather under his chin.

◂ continued from page 17

ZLD and ZLF. After it closed in 1993 it was acquired by the non-profit Musick Point Radio Group which is restoring the equipment and operating a museum in the building. The group operates with Amateur call-signs ZL1ZLD and ZL1ZLF, and In recognition of the station's historical importance, it has a license to also operate on the traditional marine radiotelegraph frequency of 512 kHz.

In 1967, 1 kW JRC SSB transmitters were installed, and if you Google on "Musick Point transmitters" you'll find photographs. At the top right of their front panels you can see twin-needle SWR meters shown in figure 4. The calibrations shown on the meter faces, however, are most unusual, quite unlike the traditional "forward" and "reflected" scales we're used to. How were these calibrations used, and what did the left and right needles indicate? Can you surmise how the voltages driving the needles were derived?

References

[1] Apollo 11 eavesdropping <http://legacy.jefferson.kctcs.edu/observatory/apollo11/>
[2] Radio interview <http://legacy.jefferson.kctcs.edu/observatory/apollo11/AUDIO/BBC-BTE-Space-Ham-TX190113-Bays-Ruth.mp3>
[3] Royal Signals Heliography <http://royal-signals.org.uk/Datasheets/Heliograph.php>
[4] Page describing kitsets <http://iza.gandi.ws/>

DX Downunder

Graeme Hunt ZL1ANH and ZL1T
<graemeh@xtra.co.nz>

Jim ZL1LC was active in March using PSK31 from Chathams as ZL7LC and there were operations from Easter Island, Spratly and Tuvalu. Mayotte TO7BC in the Indian Ocean was activated by Hartwig DL7BC who went out of his way to work several ZLs. At the end of April conditions on the lower bands haven't been so good but the higher bands have been, improving with 10m open around our lunch time to North America, Asia – including India. Right now I'm listening to Z81X from South Sudan who has an excellent long path signal on 15M around 2300z. What's this – a VK2 calling CQ Japan right on top of Z81X. I call him and let him know – his reply "I use 21290 kHz every day", however he does QSY a few kHz, but 5 minutes later he is back. It turns out he's 100 years old and as far as I'm concerned if you are 100 years old, you can use any frequency you like; otherwise *LISTEN BEFORE YOU TRANSMIT.*

In late March the worst possible news came from the Tuvalu Dxpedition T2YY with the accidental death of Ingolf DL4JS. This is not the first time someone has lost their life on a DXpedition and a reminder of the risks operators take so those in our armchairs at home can put a new country in our logs. I know DXers worldwide join me in expressing our sorrow for the loss Ingolf's family suffered.

At my QTH, I'm using three antennas for ten bands. From time to time I've found I've been on the wrong antenna, usually when I notice the power output meter looks wrong, or nobody comes back to my calls. The solution is at hand. In the *2012 ARRL Handbook* is an "External Automatic Antenna Switch for Yaesu and Icom radios." There are also several versions on the internet – try http://www.qth.com/topten/bd-yman.pdf.

The Elecraft K3 also seems to use similar data to Yaesu via the ACC plug and may be worth a try. I'm unsure about Kenwoods. ICOM use a different system and that is covered in the Handbook article mentioned above.

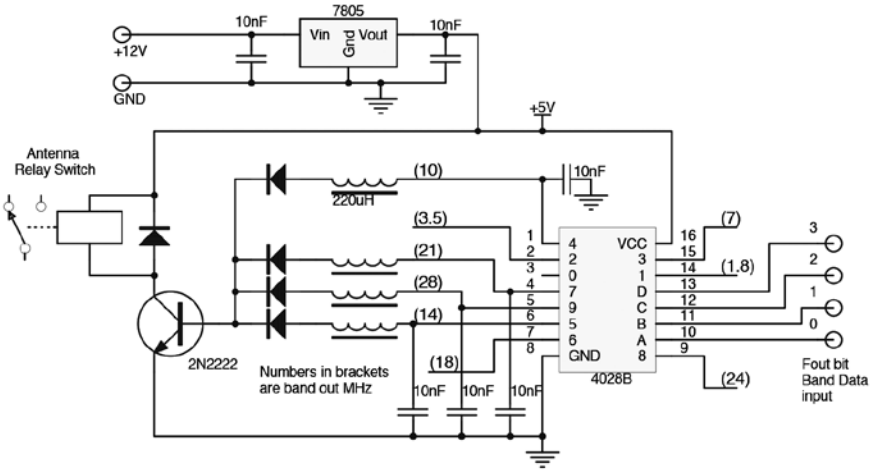
For Yaesu and maybe Elecraft, input from the band-data plug on your transceiver goes to a BCD decoder CD4028B (Jaycar ZC4028) which converts the band data input arriving via 4 wires to 10 separate pins- one for each band 160 m to 10 m. These various output voltages are used to switch relays via 2N2222 or similar transistors. Initially I found the unit worked ok but generated bad RF noise around 10 MHz. The solution was to add a 0.01µF bypass capacitor and a 220 µH choke (Jaycar LF1104) to every pin on the IC, and 0.01µF capacitor across the voltage regulator.

You decide which antennas are for which bands. For example I only use my 40 m loop for 40 m so the 7 MHz pin out switches only the 40 m antenna, For 10 m, 15 m and 20 m, I use my Yagi so those three bands all turn on the same relay, while the other 5 bands all connect to the inverted Vee relay.

There is also a manual rotary switch so I can use any combination of band/antenna. If I'm not sure whether the signal is arriving at my Yagi via the short or long path, I switch to the wire Vee, if the signal is the same, my Yagi is pointing the wrong way, if the Yagi is stronger then it's pointing in the right direction.

Logbook of the World (LOTW) has recently upgraded. Now logs posted are usually processed within a few minutes rather than several days. More and more amateurs world-wide are using this amazing facility. For every 3 contacts I post on LOTW I get a confirmation, compared to 6:1 a couple of years ago.

After 50 years on the air I finally won a contest prize I could enjoy, a bottle of Ed Munn W0YK's pinot noir; – during a US RTTY contest. The bad news was it could only be sent to an address within the US, so I've asked Ed to send it to Dave K3LP who has been on several DXpeditions that we have all benefited from, the last being Yemen 706T in 2012.



Using your band output data to switch antennas.

DXpeditions

Amsterdam Is FT5Z - FT5ZM planned for January-February 2014

Angola D2FJZ for 2013

Antarctica VK0JJJ, Craig from Mawson Base until January 2014.Active on SSB, digi 160 to 6 metres.

Burundi 9U look for HA3JB, now living there. 20m ssb and psk31

Chagos VQ9JC from Diego Garcia until sometime in July.

Djibouti J28NC for the next two years.

Gabon TR Sebastien, F4EIH, will be in Gabon for at least three years

Gough Island ZD9KX for one year.

XT Burkina Faso confirmed at last, Africa is never easy.

ZD9KN heard on the bands recently was a pirate.

Heard Island VK0HI proposed for 2014.

Juan Fernandez XR0Z Robinson Crusoe Island November 2013.

Kenya 5Z4/LA4GHA until December 2014. Also see Somalia below.

Laos XW – team operation 6-16 September – call-sign to be announced.

Luxemburg LX/OO6P between June 30 and July 5.

Marion Is ZS8C and ZS8Z; Two radio amateurs are in the wintering over team from May 2013 to April 2014.

Somalia 6O0LA and Kenya until December 2014 while LA4GHA is on a work assignment for the UN

St Pierre & Miquelon FP/KV1J between July 6 and 16.

Tanzania 5H3BB between August 2-20.

R27, RA27, RT27 and RU27 are special European Russian prefixes to 17 July to celebrate University Games

Nets

ANZA Daily: DX net at 0515z on 14183 kHz and now also Saturdays 0445z on 21205 kHz. Mondays, Fridays and Saturdays it is followed by the Pacific DX net on the same frequency from 0600z.

Arabian Net: Fridays only 0500z 14250kHz – host JY5HX and features exotic Middle East calls.

ZL DXers: KiwiDX Summer SSB Net ZL1KDX 7. 133MHZ +/- Tuesdays 0700z, DX Cafe forma;- bring your own coffee!

What's on the air now? <www.dxsummit.fi/DxSpots.aspx>

QSL information: <www.qrz.com>

Acknowledgements

425 DX News, OPDX Bulletin, NC1L. ClubLog. ARRL Handbook 2012,

Contact me at *Call Book* address, or by email at <graemeh@xtra.co.nz>.

Technology Convention Easter 2013

by Vaughan Henderson ZL1TGC and Peter Loveridge ZL1UKG

Technology Convention 2013 was held in Auckland at the Western Springs Garden Community Hall in Great North Road. The venue proved to be a good choice with plenty of space and good car parking. In total, about 50 amateurs and their partners attended over the Easter weekend.

The programme commenced at 0900 on Saturday with a welcome from Peter Loveridge, ZL1UKG, President of the Auckland VHF Group.

First presentation of the weekend was keynote speaker, Dr. Gary Bold ZL1AN on the subject of Medical Electronics. Following injuries sustained by a fall at his home, Gary spent some time in hospital. He decided to learn how all of the equipment used in his treatment worked, including X-Ray, MRI and CT scanning. Gary presented a fascinating talk looking at the origins of modern medical scanning, from the original discoverers through to current technology. What measurements can be made and how they are displayed to the staff treating investigating your body rounded out a very interesting presentation. At the conclusion of Gary's talk, Peter ZL1UKG presented Gary with a special trophy recognising his long service to amateur radio (see photo).

The next presentation was given by John Yaldwin ZL4JY on behalf of Doug Ingham ZL2TAR. The topic was Digital Amateur Television – the Wellington experience. The presentation gave some background on ATV in the Wellington area and detailed the recent work being done, conducting tests on 506 MHz to demonstrate that amateur radio could build and operate in the new band plan without causing interference to adjacent spectrum. The engineering techniques and results were presented.

This was followed by Graham Ockleston ZL1QM on the Weaver method of SSB generation and amplification of SSB by Envelope Elimination and Restoration (EER) for efficiency. The phasing method of SSB generation requires high accuracy of the 90° phase shift over the audio frequency range to transmit and receive voice. By introducing an additional oscillator at a frequency in the middle of the audio range the accuracy problem is solved at the cost of a small notch in response around the oscillator frequency. Having successfully generated a SSB signal, amplification using EER treats the amplitude and frequency separately so that the envelope amplitude can be applied to an efficient amplifier for the frequency which is produced by limiting the incoming signal to a constant amplitude. Graham described his trials and successes using these techniques.

During the lunch break, attendees were able to have a look at the latest offerings from Icom, thanks to Icom New Zealand's Sharon Dawson who took time out from her busy weekend to be present. The other trade display was from HR Holdings who had on show their range of aerials, coax cable and connectors.

After lunch, John Yaldwin ZL4JY again took to the stage to give a presentation on Digital Mobile Radio. John Yaldwyn's business 4RF has a range of products supporting public services with hand helds and base stations using encoders and decoders to manage the bandwidth requirements of ever increasing demands for services. The characteristics of the different protocols were described.

Next on the programme was Peter Loveridge ZL1UKG who took a look at time and frequency standards, comparing the qualities of oscillators. Starting with some history the Hydrogen Maser, Caesium and Rubidium atomic standards were explained with their capabilities. This was followed by man-made standards around quartz crystals and the methods used to enhance their stability. The LC VFO, the phase locked loop and the Direct Digital Synthesis showed where the amateur future was heading.

Following the afternoon tea break, Graham Ockleston ZL1QM described his work on a magnetic loop antenna and a tuning tool he developed to manage the very high Q of the loop antenna. In a city environment a dipole antenna on HF can pick up S9 noise. A magnetic loop antenna does not have the same problem or require mounting at the same height to perform well but it introduces its own problems of high voltages and currents which require careful treatment. The resulting high Q leads to a very small bandwidth and difficulty in tuning the radio. Graham described an automated analogue hardware remote tuning system which was designed to control the tuning motor on the loop.

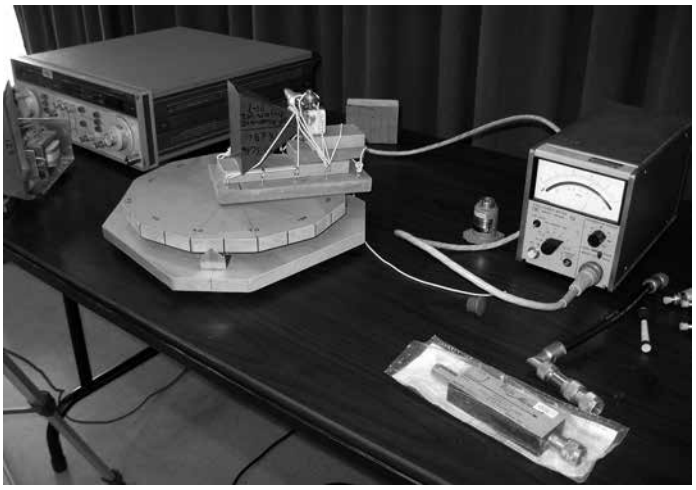
The final presentation of the day was from Robert Moody ZL1FLY who described work being done by a small group of Auckland amateurs developing wireless data mesh built with surplus wireless modems. Short range wireless modems tend to have a Linux processor controlling their operation along with computer interfaces. With modified software the modems can be made to talk to each other and determine what the transport rate for data is via any path in the net. When links go down alternate paths can be used automatically. The work being done was still in the development stage and Robert encouraged those present to get involved in this project, to increase the number of nodes on the network.

Saturday evening saw many of the Convention attendees and their partners enjoy a roast meal and movie at Ryders Cinema in Avondale. The movie *"Mrs Caldicot's Cabbage War"* was about a not so aged widow Thelma Caldicot who is coerced into a rest home by her manipulative son and daughter-in-law after the death of her husband. Her passive acceptance turns to action as her medication is discarded and Thelma, with a little assistance from her aged cohorts stages a rebellion with successful results.

Sunday and the wide range of talks and presentations continued. First on stage for the day was Kevin Murphy ZL1UJG who presented a series of short topics: AIS propagation; Meteor scatter on a limited power; Using the Signal Hound analyser and the FLEX SDR 1500 with transverters. Automatic identification System (AIS) is a marine beacon system carried by ships over 250 tonnes in weight which transmits at around 162 MHz with 10 or 2 W power. The data packet contains location. Hearing the beacon transmissions tells you there is a possible 2 m band opening and decoding the data where

Technology Convention 2013.

Ian Ashley ZL1AOX and KiwiSAT.



Test equipment at the workshop.

the propagation is coming from.

Kevin reported having some success, making use of meteor scatter and using the WSJT software. He then gave an update on the Signal Hound SA44B Spectrum Analyser. This is a software defined radio receiver with a frequency coverage from 1 Hz to 4 GHz. The unit has an SMA input connector and a USB socket for connecting to a computer running the supplied control and display software. Kevin demonstrated the SA44B and showed what the software could do. A companion TG44A Tracking Generator allows sweeping of filters, etc. Kevin's final topic was the use of a FLEX SDR 1500 with transverters for the higher microwave bands.

Grant Taylor ZL1WTT was the next speaker with his topic "Another approach to Digital ATV". Grant has developed an extensive knowledge of Ubuntu and its program development platform. Using relatively simple hardware the software available for Linux can be extended to provide the Processing done in dedicated hardware available to commercial operators. This makes generating a digital ATV stream cheaper than using the dedicated hardware. Grant showed the work he has done to date and recommended some low cost hardware.

Two members of the AMSAT-ZL KiwiSAT team were next on the programme. Fred Kennedy ZL1BYP and Ian Ashley ZL1AOX presented an update report on KiwiSAT. Ian ZL1AOX brought along the flight model of KiwiSAT in its portable clean environment. For the past year, there has been some very good progress made, but also some hardware problems with the main control PCB or IHU. Faced with two faulty IHU boards, the KiwiSAT team called in the services of a company called "Detect-A-Leak" to take thermographs of both boards to try and track where the faults were. This approach was successful, finding a faulty memory chip on one board and the FPGA chip on the other board both running at much higher temperatures than the other devices. Replacing the two defective chip has restored the flight model to normal operation. KiwiSAT is now waiting on a launch opportunity. The cost of launching the satellite has increased significantly from an initial estimate of $0.5M to about six to eight times that amount. Fund raising internationally to achieve a launch will be made easier by the science package the satellite carries.

The next presentation was from Vaughan Henderson ZL1TGC on Coaxial cables. He looked at the history and development of coaxial cables through to modern day products, a reminder of the basic properties of coaxial cable as a transmission line; of cable care and properties to take into account in a real installation.

The Sunday morning presentations concluded with an introduction by Peter ZL1UKG to the measurement workshops planned for later in the day. Kevin Murphy ZL1UJG had brought noise figure measuring equipment from Hamilton for those with preamps and transverters of unknown goodness to measure as a guide to performance. Peter ZL1UKG brought a Lazy Susan set up to hold dish feeds with signal sources, directional coupler and detector which allowed matching checks and pattern measurement to be done that can be processed by phasepat.exe available from Paul Wade. This can show what F/D is best suited to a given dish feed.

After Lunch on Sunday, the "Forum" session got under way. This was chaired by Vaughan ZL1TGC with Peter ZL1UKG taking notes.

Change of Contest Manager: Reducing support from Wellington VHF Group in promoting VHF Contests, some dissatisfaction with rules and interpretation, lack of certificates were cited as reasons for seeking a change. Stephen Hayman ZL1TPH volunteered to take on the job, and will be supported by members of the Auckland VHF Group. Stephen appointed by acclamation. Some liaison with the Wellington VHF Group required to formalise a handover date.

70cm Band Plan Review

Council reacting to member's comments have instituted a review by a working group of 3 NZART Councillors and 3 FMTAG members including Doug Ingham ZL2TAR and David Andrews ZL2SX. Submissions due by 20 April 2013. Wellington has had a pattern of short ATV transmissions; Auckland has had longer transmissions eg NASA TV rebroadcast. Don ZL2TLL reported on the high power licence issued to facilitate DATV testing. The DATV test was to allay the concerns of adjacent channel users. Comment from the floor – Australia is using a 2 MHz bandwidth which is not compatible with the general public (1/4 channel occupation). Band plans should not be fixed.

Grant ZL1WTT; Static pictures take 2 MHz, moving pictures require a 4-5 MHz bandwidth with current technology. Future compression may reduce this. Neill ZL1TAJ; the 435 to 436 MHz current weak signal satellite use must be protected. ZL2TLL reminded that the review is to see if a change is needed.

Laurie ZL1ICU commented on the low power transceivers at 433 MHz, no licence, 20 channel 25 kHz spacing are on sale. High gain antennas being sold at the same time with the SRD. Eg for a building site with headphone transceivers is being distributed by several companies. May eventually come up on repeater inputs. ZL1TGC advised our 70 cm is a shared band not exclusive. If they comply with the GURL they can't be stopped. Ministry will act to stop sale of non-compliant devices. Some discussion followed on legality of SRD's sold with a removable antenna. Are external antennas permitted?

ZL2WHO Beacons

The meeting moved a vote of thanks to Mark Kennard ZL2WHO for his work in establishing some new high power beacon transmitters on 6 m (400 W), 2 m (100 W) and 70 cm (100 W). These new beacons are being used throughout New Zealand for propagation checks and are also assisting VK amateurs to determine band openings to ZL. A letter of appreciation will be sent in recognition of his work.

Band Plans above 1 GHz

Triggered by ATV use, ZL1WTT asked for standards to be set so that ATV transmitters could be moved from district to district. USA experience is a shambles for want of standardisation. Technology is changing quickly. The 2.4 GHz band has been wiped out by wide band data noise. 2.4 GHz may be better suited to amateur data rather than video. ZL1TAJ – The 23 cm band plan has worked well and could be a model for other bands. Australia have a guard band for beacons.

ZL1UKG; Multiples of 1152 MHz should have priority for protection. Internationally the weak signal (eg EME) allocations are 2304, 3456, 5760, 10368, 24192 are all multiples of the 1152 MHz local oscillator used in 1296 transverters.

General Business

ZL1TGC advised that the Radio Spectrum Management office in Auckland is planning to dispose of large quantities of RF Test and Lab

continued on page 22

VHF Scene

Simon Watt-Wyness ZL1SWW
<zl1sww@nzart.org.nz>

VHF Scene

The winter months will soon be on us and it seems as soon as daylight saving time turns off, the weather starts to turn bad on us. Soon it will be time to spend more time in the shack as the darkness creeps in earlier. It's a good time to start thinking about and doing some planning for the next summer events.

As the winter months approach, the DX activity starts to fade a bit hence making this column a little thin! On with the column.

6 metre activity

It is good to see the progression of the analogue TV service shutdown creeping its way around the country. Keeping an eye on the various reflectors, it shows the excitement of hams as the transmitters are slowly shutting down especially in the South Island. Up north, we have to wait until December for the last one to be turned off. Again, it'll be time to think about those big beams to be putting up the towers!

If the link is still alive by the time this goes to press, have a look at <http://www.stuff.co.nz/timaru-herald/news/8611275/Sweet-sound-of-ham-radio> for an article about George Boorer ZL3PN and the free-up of the 6 m band.

Throughout April, there has been reasonable activity with contacts from VK2, VK3, VK4 and JA with some good signals coming through. The value of the 6m beacons is evident with a few spots seen from various places.

2 metre / 70 cm Activity

In April, we had the Low Band contest with 6 m through to 70 cm with a few participants up and down the country. There were some good contacts had such as Steve ZL1TPH's QSOs to Chris ZL2DX and ZL2OK. Harry ZL2ADU had some good ones south to ZL3ADT and ZL3THQ.

On the 20th April, ZL1AA Auckland Branch 02 put on another ARDF (Fox hunt) afternoon, this time at Churchill Park in the eastern suburbs of Auckland. Turnout was not quite as good as expected most likely to do with the dodgy weather. As it was, around the middle of the hunt, there was lightning and thunder with the following rain to keep us on our toes.

◂ continued from page 21

equipment. They will use Turners Auctions in Penrose who will be preparing a catalogue The Auction is expected in mid-May once the catalogue has been produced.

The proposed Resource Management Act "efficiency" changes are currently open for submissions to the Ministry of Environment until 02 April. Some changes are welcomed such as standardisation of a template for regional bodies so that they all don't have to re-invent the wheel in each one. Other changes are development promoting rather than environment protecting.

Next Convention

No offer was received to host the 2015 Convention.

At the conclusion of the Forum session, the program offered two options: A Mobile Rally ending up at the Auckland VHF Group Clubrooms in Hazel Avenue and Workshops to allow the testing of preamplifiers and transverters; microwave dish feeds. There were no takers for the Mobile Rally! Kevin ZL1UJG and Peter ZL1UKG were kept busy with a selection of preamplifers and transverters which were measured for best noise figure. Attendees with spare time took advantage of visiting MOTAT which was just across the road from the Convention venue.

The 2013 Technology Convention concluded with the traditional meal of Fish and Chips at the Auckland VHF Group Clubrooms. Peter ZL1UKG awarded prizes for a lucky swinger draw and the person who travelled the furthest to attend. Further swinger numbers were drawn to distribute prizes donated by sponsors. The Auckland VHF Group would like to acknowledge the support of sponsors Edwin Musto ZL1BBO and Kevin Murphy ZL1UJG.

Noise figure measurement; ZL1UJG foreground, ZL1TPH background.

A Barbecue was had beforehand with nice food and a bit of a chat session. We had an hour to find five 2 m foxes and there were also three optional 80 m foxes to be found as well. A good time was had by all who attended.

It seems through April that there has been reasonable activity with the WSJT contacts still happening throughout a group of people.

Harry ZL2ADU has been having fun through mid to late April, working on average 450+ km to ZL3THQ, ZL3ADT, ZL3NW on SSB, good effort guys!

On April 29th, Ross VK2DVZ was hearing Mark ZL2WHO's Beacon on 144.271 MHz – 519 at 2211 km. It could have been a long meteor ping.

Starr ZL3CU has been working hard to get a couple of 12 element DK7B 2 m Yagis up at about 10 m, so far all seems to be working well. He also mentions about some good activity on meteor scatter (MS) with some good long burns.

The scribe had put up, just in time for the contest, some beams that had been waiting to go up the tower for 2 m and 70 cm. Harry ZL1BK and Dennis ZL1UET kindly lent a hand to terminate heliax runs and pull ropes to get antennas and feed lines up to the scribe at the top of the tower. The reward being some great QSOs in no lift conditions on 2 m and 70 cm to distant places. The antennas designed were modelled up using the VK5DJ Yagi Designer software which follows the DL6WU mindset. They all pretty much worked as expected and not too much alteration needed in regard to boom correction etc.

There has been some discussion on the ZL VHF Contest reflector in regard to reviving some life back into some surplus MRF646 UHF PA transistors for 70 cm. There are several designs around, some better than others. They may not be as good as getting the newer LDMOS devices but sure are a lot cheaper!

Microwaves

During the contest period there was a bit of activity in the SHF bands, details follow below:

ZL4AA team worked ZL3NW, ZL3THQ, and ZL3ADT on 1296.

ZL1TPH/P and ZL1AA worked ZL2BKC North Mt Taranaki and ZL1BK on Ruapehu on 5760.1000 SSB. Steve was also hearing the ZL2UHF beacon on 1296.2750 @ 533.0 km from his home QTH.

VHF Technology Weekend

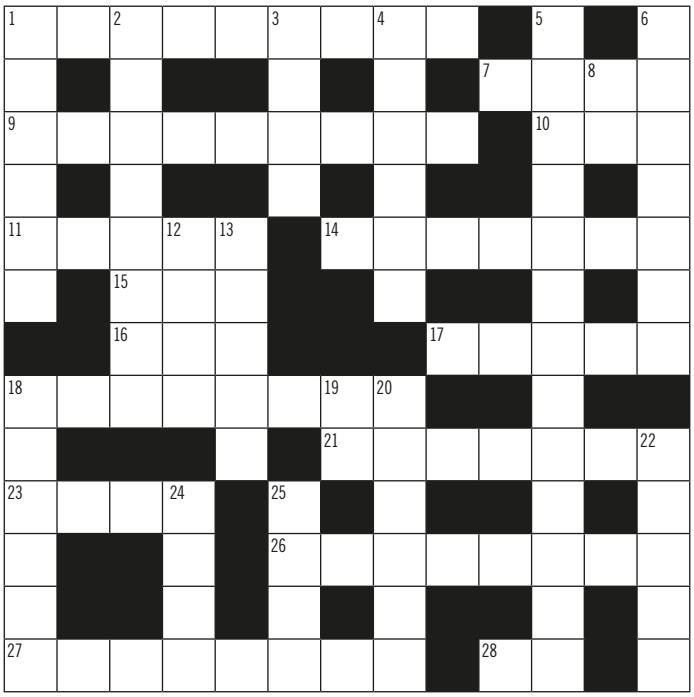
Kevin ZL1UJG brought with him, an HP 8970 noise figure meter and associated equipment to make noise figure tests on transverters as well as preamps. Several transverter were brought along and tested. There were some interesting results and for many of us, noise figure measurements are a bit out of our realm for cost reasons hence was intriguing to see how things performed.

The table shown outlines the noise figure and associated system gain.

The DB6NT / Kuhne transverters lived up to their name with impressive noise figures but I guess that's why you pay the money! Interestingly enough, the modified DXR 700 series transverters had higher noise figures but this could be attributed to the circulators in the receive path that, in most cases are out of the band we are playing in. For instance, the DXR 700-768 unit could be in the 6.5 7 GHz mark and we are using them at 5760 MHz. Other attributing factors in noise figure measurements could be loose connectors, cable issues, T/R relays etc. I know that a few of use second hand relays that may have worn / dirty contacts etc.

ZL Crossword No.22

Compiled by Graeme Hunt ZL1ANH



Across

1. The E in AREC (9)
7. Extinct ZL bird (4)
9. Completely drained of energy (9)
10. 3W/XV offensive (3)
11. Introduced invasive plant (5)
14. Searches the bands, then spots on the internet (7)
15. Type of logic gate (3)
16. Long legged VK bird, not Elle Macpherson (3)
17. Lethal (5)
18. Simplest receiver and often uses 18 down (8)
21. Formed a hole with sharp instrument, maybe for jewellery (7)
23. Volts divided by amps (4)
26. Vaned rotating disc in pump (8)
27. Vital to your computer (8)
28. South of Latvia, prefix (2)

Down

1. Types include thermal, nuclear, magnetic and electrical (6)
2. Technology for local area networks (8)
3. Former MP, Attorney-General and High-Commissioner in London, surname (4)
4. Type of darkie (6)
5. Occurred as a necessary consequence (13)
6. Not acquired, innate (7)
8. That is, abbr (2)
12. A certain amount (4)
13. Belch or burp (5)
18. They let electricity flow only one way (6)
19. Name in CW QSO (2)
20. Smooth this with capacitance (6)
22. Unit of elastance equal to reciprocal farad (5)
24. Transmitted message (4)
25. You may need one to go to a rare country (4)

(*Answers to crossword on page 38)*

Peter ZL1UKG also brought along some equipment for testing return loss and radiation patterns of microwave antennas. This consisted of a signal generator and RF power meter and various pickup antennas.

Other

Kevin ZL1UJG has been getting into writing up the FUN Newsletter. He compiles this to promote operational and construction activity on the VHF, UHF and SHF Amateur Radio allocations in New Zealand (and overseas). You can see past issues at <http://www.qsl.net/zl1ujg>

Another EME record has been made on 24 GHz. Rex VK7MO has broken a 24 GHz EME record working the Czech club station OK1KIR on 23 April. The terrestrial distance between the stations is given as 16,383 km, which extends the distance set by a 24 GHz contact between Alan VK3XPD and OK1KIR in March. Rex was using a 1.14 metre dish with about 8 to 9 W; OK1KIR was running 20 W into a 4.5 metre dish.

2013 VHF-UHF-SHF Contest Calendar

Hibernation Contest: All bands 50 MHz and up. First Saturday in June, and the following day. Delayed one week if it clashes with NZART Conference.

Brass Monkey Contest: All bands 50 MHz and up. First Saturday in August, and the following day.

Microwave Contest: All bands 614 MHz and up. First Saturday in October, and the following day.

Field Day Contest: All bands 50 MHz and up. First Saturday in December, and the following day.

For all contests, the operating periods are 1700 to 2300 on the Saturday, and 0700 to 1300 on the Sunday, NZ local time. The Contest Rules are available at: <www.vhf.org.nz/VHF-UHF-SHF-ContestRules>. All contest logs should be sent, to arrive within two weeks, to: <zl2wa@clear.net.nz>

Call-Sign	Band MHz	Device	Commercial/ Home Made	NF (dB)	Gain (dB)	Comments
ZL1TPH	2400	Transverter	Homebrew	1.75	18.2	144 if VK5EME preamp
ZL1TPH	1296	Transverter	Homebrew	1.5	21.8	144 if – ujg preamp
ZL1TPH	1296	Transverter	Commercial	6.8	3.7	144 if – Microwave Modules 1296
ZL1TPH	1296	Preamp	Homebrew	1.05	16.3	1296 ZL1UJG preamp only
ZL1TPH	3400	Transverter	Homebrew	1.7	17.2	VK3XDK trv
ZL1??	5760	Transverter	Commercial	3.5	21	DB6NT 144 if preamp /trv
ZL1TPH	925	Transverter	Homebrew	3.9	8.6	Down East Microwave
ZL1SWW	1296	Transverter	Homebrew	2.6	16.4	VK5EME with home grown pll
ZL1SWW	3.4	Transverter	Commercial / homebrew	5.6	15	DXR 740 modded
ZL1AVZ	1296	Transverter	Commercial	1	19.6	Kuhne 1296 trv
ZL1SWW	5760	Transverter	Commercial / homebrew	6.4	15.03	DXR 768 modded.
ZL1SWW	5760	Transverter	Commercial / homebrew	6.1	21.5	DXR 768 modded in rau.
ZL1AVZ	1296	Transverter	Commercial	4.2	31	Microwave Modules 1296
ZL1SWW	10368	Transverter	Commercial / homebrew	8.5	11.2	DXR 710 modded

A Table of Transverters tested and noise figure levels.

Summary

Many thanks go to the contributors who help make this column happen with their input; ZL1TGC, ZL3CU and others. If you have input and pictures for the columns ahead; such as DX activity reports, repeater installation, branch activities, snippets of interest, technical items etc, please send to Simon ZL1SWW at <zl1sww@nzart.org.nz> or *Call Book* addresses. (I also accept large picture files sent via email).

Digital Modes

Murray Greenman ZL1BPU
<zl1bpu@nzart.org.nz>

SDR with Digital Modes Software

I have been asked on several occasions recently how I successfully use digital mode software at the same time as a Software Defined Radio (purpose-designed or RTL-SDR), without using two computers. As you will realise, the SDR output is audio from the computer sound card, and the digital mode software (say for example MMSSTV or FLDIGI) needs audio in from the sound card. How do I connect them together?

With Windows XP, it's very easy. One of the sound card input options is called 'Stereo Mix' (you may have to enable it first). All you do then is select the *SAME* sound card for input to the digi-software as you have selected for the output of the SDR software. You can adjust the 'recording' (input) level to the digi-software using the Stereo Mix slider on the 'Recording' applet.

The situation with Windows 7 (and probably Windows 8, which I am avoiding) is rather more difficult. For reasons best known to Microsoft, they have designed the sound applets in such a way that they make radio applications very difficult to set up, and routing audio from one application to another impossible. I suspect this is to avoid any liability for Digital Rights (music and video) copyright infringement. There is a third-party software solution, called a 'Virtual Audio Cable', but that is complex to set up, and can involve considerable delay (latency) as the signals are routed around inside the computer. If you were to try tuning in an SSB signal with two seconds delay between adjusting tuning and hearing the results, you would understand what I mean! No listening pleasure at all. I also found the VAC software rather tacky and, unless you pay for it, full of advertising.

If you run LINUX, a low-latency applet called 'Jack' solves this problem, but for Windows 7, my advice is to use a second sound 'card'. I suggest buying a high quality USB device (better audio and probably more accurate sampling rates), but even a very cheap (US$2.70) model such as the Crystal Blue[1] may be adequate for reception. For some applications you may need to experiment with sampling rate. You will also need a stereo cable to connect the two sound ports together.

Set the SDR program to send audio to the computer's regular sound output, set the Record Input of the digi-software to the USB device, and connect the stereo cable between the regular sound output Line Out and the USB device Line In or Mic In, and adjust the levels accordingly. As with an internal connection or VAC, you will find that the SDR audio listening level affects the input level of the digi-software, but you'll soon get the hang of it.

RTL-SDR with the MAC

I had a visit from Ted ZL1BQA today, and he reported that he is successfully using an R820T dongle and an OSX port of the GQRX software. Installation and setup was apparently a breeze, with no drivers required. He agrees with me that the R820T tuner chip is more sensitive than the older E4000 dongles.

What is most interesting however, is that he believes that reception sensitivity is better with GQRX than with the same antenna and dongle using the SDR# software. I'll try to get to the bottom of this anomaly! I would also like to share more information about running RTL-SDR with other platforms, so if you have experience with MAC, FreeBSD, Android or Linux etc, write to me!

TV and DAB using the RTL Dongle

In a final experiment with cheap TV dongles, I had a go at installing the device for its original purpose; Digital TV and Radio. I chose to use my fastest computer, a 2.8GHz quad-core with 4GHz RAM and Windows 7, and used the 'EZCAP' dongle. After some false starts, I was able to get the RTL2832U drivers to load correctly. I then loaded the software which came with the dongle, NewSoft Presto! PVR, which can receive DVB-T, DAB and FM. For some reason which yet escapes me, it was unable to find any TV stations, but found about 30 FM radio stations, and in

Figure 1. The NewSoft radio applet.

this mode runs extremely well. The software does not decode RDS data, but the audio quality and low level of stereo noise is impressive; I even have good reception from Waikato stations on a TV antenna pointing the other way!

The remote control also works well, although the sensor is on the top when the dongle is plugged into the front of the computer, which is hardly convenient!

Kordia is testing DAB in Auckland and Wellington on 227 MHz, and with the 'EXCAP' dongle and Presto! PVR I am able to receive six channels in Waiuku. Reception is excellent, with just the occasional brief 'tweek' on the audio, but a really good antenna is required (I use my discone at 7 m). My senior-citizen ears are unable to tell much difference between DAB and FM, although there is less noise on DAB reception.

I then installed Windows Media Center (which comes with Win7), and it happily found my TV dongle and, much to my surprise, found 18 TV channels! Not all of them are good reception (pixellated or frozen pictures) due to antenna limitations, but on the others the image and sound quality are excellent. The responsiveness of my fast computer was also very good. My experience some years ago with computer digital TV had been disappointing, so this came as a welcome surprise.

Oddly enough, Media Center couldn't find any FM or DAB radio stations! Blaze TV, which I also tried, looks good and does a nice job of all three modes, although I've yet to work out how to edit the channel names.

Important new digital mode

I promised in the last column that I would soon announce a completely new digital mode, and here it is. The new mode is called MFSK31, and is from the same author as PSK31 (Peter Martinez G3PLX). Like PSK31, it was designed for use over noisy HF paths using SSB radios. The new mode uses 4FSK (four tones sent one at a time) at 31.25 baud, and has a convolutional coder to allow forward error correction, which is achieved in the receiver using a linear trellis decoder rather than a more conventional Viterbi digital decoder.

The new mode runs at the same text speed as PSK31, and it even uses the same varicode alphabet (see my comments below about ITU-R M2034). The convolutional coder is based on the NASA R=1/2 K=7 recommendation. The 4-FSK tones are spaced at 1.5 times the baud rate (46.875 Hz), and band limited, making the transmission just 187.5 Hz wide, or roughly three times that of a well-adjusted PSK31 signal. The bandwidth figure of merit for this mode is a very good 3.75 Hz/wpm.

The band-limiting filter in the transmitter gives the tones a very clean sound with edges smoothed in the time and frequency domains. The filter causes slight delay, so the decay of one tone and the increase of the next overlap slightly. Despite this, the signal amplitude is reasonably constant, and transmitter linearity

Figure 2. Media Center in live TV mode.

not as essential as with PSK31.

The receiver uses the same filter, (a root-raised cosine filter) and four square-law detectors feeding the linear trellis decoder. This use of transmit and receive matched filters and trellis decoder are a departure from previous amateur MFSK modes such as DominoEX and MFSK16, where due to computer processor limitations at the time, the transmission was 'hard keyed' and an FFT detector used. This new approach, handling the signal in a linear manner, makes MFSK31 most effective, giving performance in Flutter (long path DX), Doppler (trans-polar DX) and NVIS (80/40m) conditions unequalled by existing modes.

In Figure 1 you see the results of some ionospheric testing I did recently, simulating these typical propagation conditions, and with very weak signals (-12 dB S/N, so weak you can hardly hear them). The grey area in the picture (below 80%) is considered in my evaluation to give insufficiently good copy for a comfortable QSO, and under 50%, even accurate station identification is unlikely. Under the conditions described, none of the existing modes achieve even modest copy, and you can clearly see that in each case the new mode is rather better than the others shown. I tested many other modes as well, but only those listed had measurable reception under these conditions. Without ionospheric effects (AWGN, just white noise) the modes are hard to tell apart at –12 dB. MFSK31 gives better than 80% copy down to –15 dB, while DominoEX4 and THOR4 give 80% copy at about –18 dB. It is important however to recognise that these modes are narrower, and are much slower than MFSK31.

Under real conditions, reception of MFSK31 is excellent on most paths experienced so far, even with weak signals. Con ZL2AFP has already worked two UK stations on 20m using 'grey line', so the prospects for long haul DX seem very good. It seems that if you can find a signal, you should always be able to copy it. At present the new mode is available only in a simple single-mode program, and you can get a copy by writing direct to Peter[2].

In Figure 4 the sound card selections are made at the top, just below

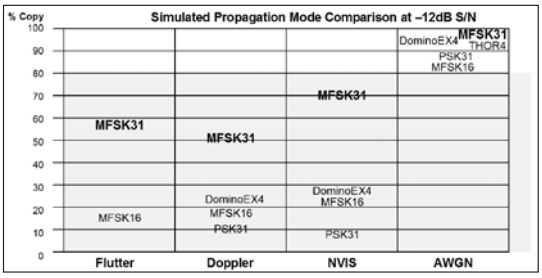


Figure 3. Comparison of MFSK31 with other modes.

a simple menu which allows saving to file and sending a file. The large receive screen is just below, and below that a narrow waterfall display used for tuning. It is very easy to identify the 4FSK signals, and tune to them by clicking on the centre of the signal with the mouse.

The smaller transmit window is just below the waterfall. You can type-ahead, and also prepare text while receiving. There are no text-editing facilities, and no cut-and-paste, although the backspace key works even while transmitting. The interesting little box bottom left is a sync window. Each of the four tone detector outputs is displayed as a different colour. The horizontal axis is time (spanning slightly more than one symbol, 32ms) and the vertical axis signal strength. When the signal is synchronised, the centre of each line is mostly higher than the edges. You should keep the signal in the bottom half of the box using the receiver and sound card level controls.

I have tested the software with Win XP Pro and Win 7, and it performs well, including rig control using direct COM port or a USB serial port. I found a few minor functional limitations, but remember this is a single-mode test program written to demonstrate and test the mode. I would expect to see this new mode incorporated in the major multi-mode programs before too long.

Most of my experience with the new software has been on 80 m, with some QSOs on 40 m, and I have found it very good. Close to 100% copy (or rather, most of the errors seem to be typos!). The software is easy to use and the performance really brilliant. I thoroughly recommend it, and feel a little miffed that the new mode outperforms the MFSK16 mode I designed specifically for long-path DX back in 1999 – but then I guess that is inevitable, as things have moved on considerably since then, especially in terms of available computer performance.

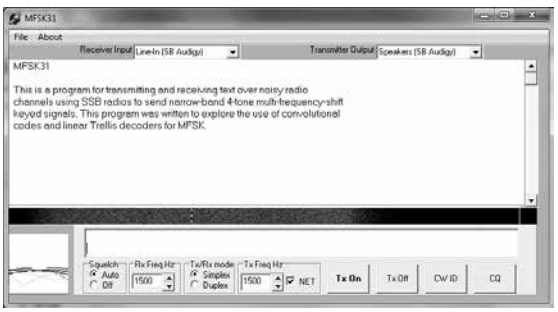

MFSK31
File About
Receiver Input
Transmitter Output
MFSK31
This is a program for transmitting and receiving text over noisy radio channels using SSB radios to send narrow-band 4-tone multi-frequency-shift keyed signals. This program was written to explore the use of convolutional codes and linear Trellis decoders for MFSK.
Squelch
Rx Freq Hz
Tx/Rx mode
Tx Freq Hz
NET
Tx On
Tx Off
CW ID
CQ

Figure 4. Screen shot of the MFSK31 application.

New Antenna Analysers

You may recall that Denis UU-9JDR visited New Zealand in the late 1990s. I had some interesting discussions with him about the future of digital modes and digi-software, and dragged him along to a Papakura Radio Club meeting. He and Nick UT2UZ designed the widely used digital mode software MIXW over the ensuing few years. They developed the RigExpert digital interface, which I tested in an early form (they now also have USB models) and a range of other products and software.

RigExpert have recently announced a range of really excellent and well priced antenna analysers[3]. Some of the VK LF/MF folk have been singing the praises of the AA-30 model, which covers 0.1 to 30 MHz. I understand Dave ZL1BJQ has one. If you don't wish to deal direct with the Ukraine, you could email-order from Canada[4]. If you have one of these analysers, write me a brief review!

ITU Recognition

The International Telecommunication Union regulates and recommends best practice regarding everything to do with radio, wired and satellite communication around the world, including commercial, governmental, military and amateur communications. So when the ITU-R (the Radiocommunication Section of ITU) decides to make a recommendation, it carries considerable weight. In March this year the ITU-R released Recommendation ITU-R M.2034[5], which relates to the alphabet used for PSK transmissions, specifically PSK31, which it describes in some detail. They have thus in effect recognised the efforts of Peter G3PLX in developing the varicode and PSK31.

I checked their publication database further, and discovered that my 1999 invention, MFSK16, is also recognised by ITU-R, at least to the extent that details of the mode (designation 316HJ2B/D) are listed in a table in ITU-R M.1732-1. Take a look at the list of ITU-R publications relating to mobile, satellite and amateur service[6].

Brooks Shera QRT

Well-known radio amateur and Time & Frequency enthusiast Brooks Shera W5OJM died recently aged 77, after a long illness. In 1998 he published the first popular design for an amateur GPS Disciplined Reference[7]. Many of these were built, and are still being built today. While some newer designs are much simpler (e.g. my 'Simple GPSDO')[8], Shera deserves recognition for developing the techniques and algorithms that first put high performance references in reach of amateurs.

References

[1] <dx.com/s/9723>
[2] <Peter.Martinez@btinternet.com>
[3] <www.rigexpert.com/index?s=aa54>
[4] <www.rigexpert.net/main.html>
[5] <www.itu.int/dms_pubrec/itu-r/rec/m/R-REC-M.2034-0-201302-I!!PDF-E.pdf>
[6] <www.itu.int/rec/R-REC-M/en>
[7] <http://www.rt66.com/~shera/QST_GPS.pdf (Published in QST July 1998)>
[8] <www.qsl.net/zl1bpu/MICRO/SIMPLE/SimpleGPS.htm>

Longer Wavelengths

Con Wassilieff ZL2AFP
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VK2DDI grabber receives 137kHz transmission from DK7FC

Yet another LF DX record; this time the VK2DDI LF grabber in Tasmania has received 137kHz signals from the other side of the world; the DFCW-180 (3 minute dots) transmission for DK7FC in Germany, a distance of 16 806km. This was between 1730 and 1930 hours UTC on 8 April 2013. Propagation conditions were considered to be exceptional at the time.

Finland amateurs now on 630 m

As of 26 March 2013, licensed radio amateurs in Finland have access to 472-479 kHz. Power is limited to 1W EIRP and maximum bandwidth 1 kHz.

Digital voice on 630 m

Dale VK1DSH has been transmitting digital voice on 630m. The VK's seem to have a (self-imposed?) bandwidth limit of 1 kHz and so normal SSB voice transmissions are not strictly kosher. FreeDV[1] can transmit digital voice in a 1 kHz bandwidth and so is a candidate for voice transmissions in VK. To quote from the FreeDV web page:

"FreeDV is a GUI application for Windows and Linux (MacOS and BSD are in testing) that allows any SSB radio to be used for low bit rate digital voice.

Speech is compressed down to 1400 bit/s then modulated onto a 1100 Hz wide QPSK signal which is sent to the Mic input of a SSB radio. On receive, the signal is received by the SSB radio, then demodulated and decoded by FreeDV.

FreeDV was built by an international team of radio amateurs working together on coding, design, user interface and testing. FreeDV is open source software, released under the GNU Public License version 2.1. The FDMDV modem and Codec 2 Speech codec used in FreeDV are also open source.

Amateur Radio is transitioning from analog to digital, much as it transitioned from AM to SSB in the 1950's and 1960's. How would you feel if one or two companies owned the patents for SSB, then forced you to use their technology, made it illegal to experiment with or even understand the technology, and insisted you stay locked to it for the next 100 years? That's exactly what was happening with digital voice. But now, hams are in control of their technology again!

FreeDV is unique as it uses 100% Open Source Software, including the audio codec. No secrets, nothing proprietary! FreeDV represents a path for 21st century Amateur Radio where Hams are free to experiment and innovate, rather than a future locked into a single manufacturers closed technology."

My sentiments exactly!

The audio codec (called "Codec2") was developed by David Rowe VK-5DGR, who did his PhD work in voice coding, and the modem was based upon FDMDV by HB9TLK. FDMDV was a working digital voice system a few years ago, but it used a proprietary audio codec and I gather it ran into problems with intellectual property rights issues.

Now, how does it actually perform on the lower bands? Murray ZL1BPU and I tested it on 80 m and found it was tough going. FreeDV has no forward error correction (FEC) which makes it vulnerable to selective fades and noise bursts which corrupt the recovered speech in a vaguely humorous fashion, interposing "oinking" sounds among the (otherwise good quality) speech. Exactly how it behaves on the lower frequencies remains to be seen, as VK1DSH was unable to be decoded by any other stations even though the signal was detectable. The 1600 bit per second version of FreeDV is claimed to be able to work down to 2 dB signal-to-noise ratio, but this would be under otherwise perfect conditions, which virtually never occur on the lower HF bands. I understand it does work well on 20 m though.

The lack of FEC and interleaving, both of which are necessary to protect a signal against burst noise and selective fades, is deliberate. This results in low latency, fast synchronisation and quick recovery from fades. The price to pay is the occasional loss of speech.

As FreeDV worked so poorly on 80 m it occurred to me that there might be an analogue solution which would be more tolerant of selective fades and burst errors. So I set about developing my own version of a "digital voice" system for 80 m. Some time ago I developed a multi-carrier television system, called FFT-TV, which consisted of 48 carriers each of which were frequency-modulated by the pixels on each line of a 48 line picture. The modulation rate of each carrier was equal to the spacing of the carriers (48 pixels per second). This low baud rate makes the received picture more immune to multipath propagation (ghosting) which plagues SSTV with its much faster baud rate.

So I reasoned the same system would work equally well with a number of carriers modulated by the output of a bank of filters which analysed the speech into the various important frequency bands (formants). A simple vocoder was easy enough to do in software, and it seemed to work tolerably well during bench tests from one computer to another. But a number of problems soon became evident when tested on 80 m. Firstly, the sound card sample rate at the send and receive end had to be pretty much exactly the same, and tuning in the carriers at the receive end had to be accurate to better than 1 Hz, otherwise a horrible "buzz" was heard. This buzz is the sound of the harmonic generator at the receive end which is modulated by the amplitude information on each carrier to recreate the original speech. With no speech to modulate the carriers there should be silence, the equivalent of the black level in my FFT-TV system. Think "Daleks" and you will get the general idea.

Noise and selective fades result in small frequency deviation of affected carriers, because a rapid change in signal level will appear as a small frequency deviation which the receiver cannot distinguish from the transmitted signal, so the whole signal had a raucous buzz superimposed

Small frequency offsets in receiving my FFT-TV resulted in corresponding changes in picture brightness which is tolerated by the eye, but the ear is far less tolerant of similar offsets. Murray's description of the received signal was of Daleks at the bottom of a muddy river!

I am currently working on a single tone FM voice system, in which I merely frequency-modulated a 2.6 kHz tone with speech and transmit this via regular SSB, demodulating it at the other end using software defined radio (SDR) software that includes FM demodulation. The reason for this change to FM voice is that it will allow non-linear (Class D or Class E) amplifiers to be used, whereas FreeDV requires a linear amplifier chain. It has been pointed out to me by wiser folk that I might just as well use regular NBFM, but generating the FM voice at baseband does have the advantage of flexibility as it is all done in software. Software programming is an experimenter's paradise.

So far, initial tests on 80 m show that it is definitely not going to be a weak signal mode!

RTL-SDR on low frequencies

In the Digital Modes column of the March/April issue of *Break-In*, Murray ZL1BPU described how the RTL-SDR (TV dongle) can be used on the lower frequencies by connecting an up-converter to the front end. The RTL-SDR consists of a VHF tuner and an 8-bit A-D converter. The tuner works down to only about 22 MHz (depending upon which tuner chip is installed) hence the up-converter required to receive lower frequencies. The up-converter Murray used worked down to 40 kHz with some loss of sensitivity and a higher noise level. This covers all of our LF and MF bands and all of the bands up to 10 m. With a receiving bandwidth of up to 2 MHz, huge chunks of the spectrum can be seen at a time.

An alternative method of extending the RTL-SDR down to lower frequencies (including 0 Hz) is to bypass the tuner and connect the signal directly to the input of the A-D converter. This is known as the "direct sampling" mode[2]. The <www.rtl-sdr.com> web site has links to other web sites with useful information about the hardware modifications and software to enable the direct sampling mode.

One of these has the following

description of what to do:" ...by attaching a long wire, or better, a 50 Ω to 200 Ω transformer and a low-pass- filter to the In-phase ADC input (pin 1 or 2 of the RTL2832, whereas pin 1 is at the molded dot) it is possible to listen to shortwave radio stations. The coupling capacitors can be left in place, but for better results they should be removed. Tuning in this mode is done with the DDC, and since the ADC samples with 28.8 MHz, tuning is possible from 0 to 28.8 MHz"

The casing of the dongle is easily removed, exposing the circuitry which is accessible with the help of a microscope and a steady hand. Figure 1 shows my "EZCAP" dongle prepared for temporary surgery. The leads from pins 1 and 2 of the A-D chip are hidden beneath the infra red remote control detector but it is easy enough to trace where everything goes.

So far I have not been brave enough to remove the two coupling capacitors and separate the input of the A-D converter from the output of the tuner, but I have had some results by simply connecting a lead directly to pin 1 of the A-D chip. It is likely that the capacitors short circuit some of my input signal to ground and an improvement in signal level might be possible by removing the coupling capacitors, as noted in the description above. I have managed weak reception of 2YA on 567 kHz by attaching a wire directly to pin 1 (or pin 2). In theory the receiving software (HDSDR etc) must be set to "direct sampling I input", or Q input if the transformer is fitted between pins 4 and 5 of the RTL2832 chip.

Figure 2 shows which capacitors may be removed and how to couple the input to the A-D via a balanced transformer. Information on the RTL2832U chip does not appear to be available to mere mortals (see my comments above on what I think of this sort of secrecy thing!) but reference [2] has enough information to get one started. I imagine you will need to take care that ESD does not destroy the A-D chip.

630 m net

The liaison net is now back on 3666 kHz, starting at 8:30 pm. Transmissions on 473.1 kHz typically begin at 8.40 pm with 5 minutes allocated to each participant. Now that daylight saving has ended and there is good sky wave propagation, the net will run weekly each Thursday.

References

[1] http://freedv.org/

[2] http://www.rtl-sdr.com/rtl-sdr-direct-sampling-mode/

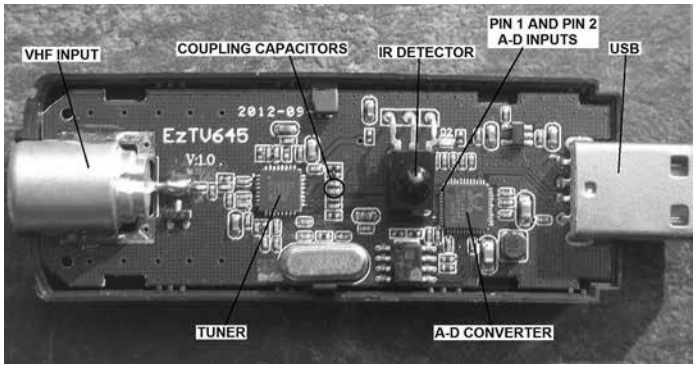

Figure 1. EZCAP dongle circuit board.

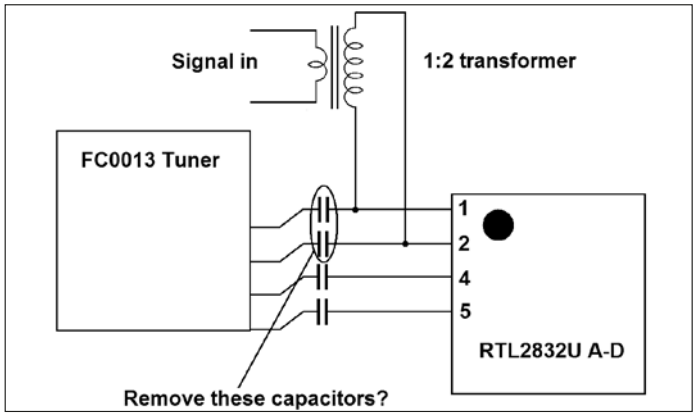

Figure 2. Direct sampling circuit modifications.

QSL Bureau

by Barry Stewart ZL2RR
<zl2rr@xtra.co.nz>

Greetings from Bureau Headquarters, Wanganui. Very little activity (again!) to report on this month: The recent postings have been a 5kg package each to ZL1 and ZL2 Sub-bureaux at the end Of March. During March and April two by 700 g envelopes of QSL Cards were forwarded to the ZL3 and ZL4 Sub-bureaux.

The pace of business at the Central Bureau is such in recent months that one could believe that we were actually going through the trough of the Sun Spot Cycle: this applies equally to incoming cards from both ZL and DX. No doubt the pace will pick up through the remainder of the year.

I reported receiving an envelope I had mailed to Lithuania (LY) late December. The label address was crossed out with 'Return to Sender, address unknown' endorsed on the envelope. After finding no information to contradict the Association's address I reposted the envelope and at this point, two months on, it has not been returned to Box 857.

It is interesting to watch some of the mail coming into the bureau from overseas. In the Jan/Feb 2013 issue of *Break-In*, I recorded receiving a Royal Mail Post-bag that had one package in it; a parcel of QSL cards from Italy. Yesterday a box of cards arrived from the ARRL. A sticker in the right corner of the box stated 'If undeliverable please return to Swiss Mail Zurich.' On the side of the package was a large Swiss Post International (UK) sticker complete with a Heathrow Estate address complete all shipping details for this package. It must be a competitive Postal market up North. Wonder what delivery time delays are encountered with this sort of 'wheeling/dealing?' Overseas magazines seem often to be carried by Post Offices other than that of the magazines' countries of origin.

A reminder! Please sort your QSL Cards as per the instructions in the *Call Book* and website.

Any cards for the USA should be sorted in district order with all prefixes sorted together i.e. A-K-N-W 1 go together, A-K-N-W 2 likewise and so on. KL and KH prefixes have their own Bureaux along with the various US possessions. Please write the call-sign of the station worked (or QSL Manager) on the back of each card. A few Bureau users will write the QSL Manager call on the back of the appropriate card (s) but not the stations' call-signs on the rest of them: Unfortunately, I am not psychic and, unless it is obvious to me that it is a rare country/DXpedition and I turn the card over, some cards must go to the wrong bureaux.

A reminder: The present 'Nairobi' model IRCs expire at the 31 December 2013. It is a good time to catch up on your direct QSLing and use up any of these IRCs on hand. The new Dohar model IRC is available from 1 July 2013, valid for exchange until expiring 31 December 2017.

The IARU has informed of the closure of the following QSL Bureaux: ET: – Ethiopia; VQ9 – British Indian Ocean Territory and KH8 – American Samoa.

The Association thank those members who include a donation with their QSL cards from time to time. This generosity with helping to assist in reducing the Bureau's operating costs is most welcome.

If you have any questions, queries (QSL Manager's addresses, etc) or comments please feel free to contact me either via mail (1 Caversham Road, Westmere, Wanganui 4501 or PO Box 857, Wanganui Mail Centre 4540), or Email: <ZL2RR@xtra.co.nz>

73, *Barry ZL2RR*

Next deadline for copy is
10 July 2013

Letters To The Editor

All Letters to the Editor must be signed and include the author's full name, call-sign, (if applicable) and address. Opinions expressed here are those of the author and do not necessarily reflect official NZART policy.

Letters to the Editor: guidelines to contributors

Letters to the Editor should be concerned with Amateur Radio and normally not exceed 400 words. Break-In *follow the guidelines given on page 4-3 of the 2002-2003* Call-book *"Standards of language, and topics best avoided". Accordingly sex, race, religion and politics are not acceptable subject matter.*

Cave Radio – an Opportunity for Radio Amateurs & Electronics Enthusiasts

Communicating between a cave and the surface is a formidable challenge yet it's a common requirement for underground explorers and it plays a vital role in coordinating cave rescues. With the growth of interest in low frequency radio in recent years, radio amateurs and electronic enthusiasts are well placed to make a contribution in this area. Indeed, many of the cave radio currently used by the world's volunteer cave rescue teams were developed by radio amateurs.

If you'd like to get involved in this unusual yet fascinating area of radio communication, and perhaps make a contribution to the state-of-the-art, the *Journal of the Cave Radio and Electronics Group* (CREG), published by the British Cave Research Association (BCRA), is essential reading. While we are based in the UK we aim to provide a service for the international community and have subscribers in several countries. With the recent introduction of online access, costing just £4.00, it's never been cheaper to learn about sub-surface communication. If you want to get a better feel for the sort of articles published in the *CREG Journal*, just head to <http://bcra.org.uk/pub/cregj/> where you can see a contents list for the current and previous issues. You can also sign up here for a year's subscription (normally four issues) for either the new online access or to receive the paper edition in the post.

Regards,

Mike Bedford, BCRA CREG

NZART Council and the 70-cm review

The President stated in the Mar/Apr *Break-In* that one complainant's in particular's letters were released to Council on the condition they remained confidential and he was not able to expand further on their contents.

ZL2CA has written multiple letters to RSM also released to Council expressing concerns about the 70 cm Bandplan. His letter of 21/01/13 extract below, notes explicitly that he actively seeks their distribution.

"I understand that NZART Council is soon to conduct a review of an amateur band plan for 430 – 440 MHz. As the topic of my correspondence with RSM seems to have some relevance to their review, and RSM has likely supplied NZART with at least my first letter, then I've elected to email advice copies of all my RSM submissions direct to each NZART Councillor. I have no reservation on copying and distribution of material I've produced"

Given this emphasis that his documents are public and they formed a part of the complaint-based reasons for this review (his RSM letters are included) it is astounding that Vaughan tells us it is confidential and the report remains unpublished. At the time of writing the FMTAG members on the review group have not been provided with a copy.

I wrote to Vaughan requesting clarification about his statements, he advised me that the error was "not of any great importance" and he "may" correct it in the next *Break-In* and he is happy with the path this review is taking. He has not responded as to how he came to misunderstand this point.

This review has no published Terms of Reference (TOR) despite a 2nd draft being provided by the FMTAG chair to Councillors to address their initial concerns. It is fundamental to any review process that TOR are published prior to a review.

Members have been kept ignorant of the detailed evidence for this review, the nature and resolution of complaints or whether there is even a single verified instance of interference from the "significant number of amateurs" who expressed concerns. How many is significant we don't know. My constitutionally valid request for the "factual evidence Council used to inform their decision to hold the review" remains unfulfilled.

The review lacks transparency; no review can have so many defects if it is to be credible. I am not optimistic Council will alter course but I hope this letter at least alerts members to the serious flaws in this review.

(Signed) T. Linney ZL2TB

Sir, The New Zealand Amateur Radio Study Guide"

"Curiouser and curiouser", the words of Lewis Carroll's Alice in Wonderland are true today when following the activities of NZART Council. It is common practice to send letters to a President. So I was very surprised to find that a whole special issue of *HQ InfoLine* conveys a response to my letter! I am honoured! *(Issue 39s, 7 May 2013.)*

Some Council members had expressed difficulty understanding copyright so a legal letter for clarification was obtained at no cost to the Association. Respecting legal privilege, it was forwarded to the President. A response surprisingly turns up in InfoLine!

Space will not permit identifying inaccuracies in that confusion-generating release.

"The New Zealand Amateur Radio Study Guide" and the question-bank are separate entities. The Guide idea and title are mine. The title *"NZART Study Guide"* was avoided to keep it all at arm's length from the NZART Council as the Ministry required.

A public examination using the first (1999) bank would have been disastrous. It was some 50 questions short and about 180 more questions were rewritten or replaced. All 600 questions had to be scrutinised and edited and regulatory matters Ministry-checked. Experienced tutors gave summer holiday hours to the task over six weeks.

A new bank was developed circa 2007. The visually-disabled with text-to-speech readers want a level playing field. An upgraded Guide and Bank were blended into a coherent resource correcting defects found from experiences with the original material. The new system is audited and approved by RSM.

Seemingly unable to comprehend the highly improved new teaching and testing facility, NZART Council ignored the new and decided to "update" the old.

The proposal to NZART Council permits retrieval and post-2006 changes to the "old" with approval from its originators if the origin is acknowledged.

A simple statement at the beginning of documents is all that is required. My letter to the President advises Council accordingly. The Study Guide title is with the new material and not available.

The President telephoned me late last year. We discussed question-banks. The call ended with him saying he had to break off but would phone back. I'm still waiting.

Curiouser and curiouser indeed! Meantime visit < http://littleurl.info/svg> and refer others to it.

73, *Fred Johnson ZL2AMJ*

A brief reply to ZL2AMJ's letter to the Editor:

Dear Members,

Fred Johnson, ZL2AMJ's opening quote "Curiouser and curiouser" from Lewis Carroll's Alice in Wonderland appropriately sums up the difficulty your Council is experiencing trying to achieve one simple object: to have an updated amateur radio training package and examination system hosted on the NZART web site.

As a member of the NZART Executive Council, I had expected a much greater degree of cooperation from Fred and perhaps naively, had expected that he would want to work for and in the best interests of the Association. This does not appear to me to be the case. His present stance, where the package of examination training material and question bank must be under his control and hosted on another web site is not acceptable to the majority of your current Council and I am sure to you also.

In addition, there are some other conditions attached to that way Fred has proposed his "system" will work: If adopted, we will see the current system whereby Branch Examination Supervisors can generate examination papers "on demand" replaced by a system similar to the old NZPO examination regime – a limited pool of exam papers will be produced at a central location and couriered out

Awards

Awards Manager: Alan Chapman ZL3GX
<awards@nzart.org.nz>

August sees the start of the new Taranaki Award which replaces the old Rhododendron Award. There has been a change of finish date from the April column and is now 15 August not 18. The Award will be a series of original paintings by local artist Jude Barnes. For those who only have VHF our members will be available to give out points on local repeaters 720, 705, and National system.

By the time you are reading this column we will have been to and returned from a 23 day tour of China.

Taranaki Award

The Award will run from 10 August till 15 August 2013 Inclusive. Note: change of finish date 15 not 18 August. It is available to all Amateurs and short wave listeners.

Contacts may be made on any band, any mode. Each station may be worked ONCE ONLY for each separate application for the Award.

Compulsory contact with Special Station ZL6RFA 5 points.

(We are retaining our call-sign from our previous Rhododendron Festival award).

Contact with Taranaki Branch Stations.

New Plymouth Branch 27 ZL2AB 3 points.

Waitara Branch 47 ZL2TO 3 points.

South Taranaki Branch 87 ZL2QF 3 points.

Inglewood Branch 19 ZL2PT 3 points.

Opunake Branch 32 ZL2ANN 3 points.

Hawera Branch 14 ZL2HWA 3 points.

Each additional Taranaki station (A Station whose base is in Taranaki) 1 point.

25 points are required for the award.

Copy of log and fee of $5.00 to arrive before the 31st August 2013.

The Award Custodian.

Branch 27

c/o 45 Robe Street

New Plymouth 4310

Fee including return Postage; Certificate $5.00 each

The Award Certificate will be a photo of Mt Taranaki

The ZL Awards Net – 3.677 MHz from 8 pm each evening (Counties)

Taranaki Award Net – 3.660 MHz ± 9pm each evening

In Conjunction with the Taranaki Award we will be running the Dan Wilkinson Memorial Contest.

Taranaki Award 2013.

Dan Wilkinson Memorial Contest

Certificates will be awarded for 1st, 2nd and 3rd place for both Taranaki stations and those outside the region.

The Dan Wilkinson Memorial Stone Trophy will be engraved with the Taranaki station who has the most points. However because of the size and weight of the Trophy it will remain in the club rooms of Branch 27.

The wooden Trophy to be awarded to a station other than a Taranaki station that has achieved the most number of contacts with Taranaki stations that qualify to give out points in the Taranaki Award. The Trophy is to be held by that station for 12 months.

Dan Wilkinson was the original holder of the call ZL2AB

Club Awards

Clubs running short-term awards or new awards should send details of the award to me via email or at my *Call Book* address or the address below. Remember that *Break-In* is only published on even months and copy, including, if possible, a copy of the certificate, for inclusion, should reach me by the end of the even month.

The Awards Net runs on 80 m, 3.677 MHz every night from 0800 UTC every night of the year. Every one is welcome to join in especially if you are mobile and in a rare county or district.

NZART Awards Manager, PO Box 1733, Christchurch 8140. <awards@nzart.org.nz >, <www.nzart.org.nz/activities/awards/>

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in a sealed envelope at the request of the Branch. This approach will add significantly to the cost of administering the examination system, and destroys the flexibility of the current system where Branch Examination Supervisors can provide an examination at very short notice.

Fred also proposes to abandon the examination paper generation software package written by Gary ZL1AN in favour of a new software package. My request for details of this and who it was written by have not been answered. Your Council and I have not received and indication from the ministry that a return to "the old way" is required In fact our present examination system is working well and is a tribute to the integrity of our Branch Examination Supervisors.

Fred has also taken the step that I am sure that you along with myself would find bizarre: claiming copyright for the NZART examination database. Bizarre for two reasons: firstly, as you will see below this move has no justification (more complete information was included in the NZART Infoline referred to by Fred) and secondly, why would a loyal officer of the Association want to do this?

In 2006 in response to an e-mail from the then MED advising that an outside examiner was proposing to use the NZART exam question bank Fred assisted in the preparation of the following for NZART Council:

"It has been developed by volunteers with professional experienced (sic) in examination work and in multiple-choice questioning in technical institutes and universities. Countless voluntary man-hours have been invested by many individuals. The present questions bear little resemblance to the handed-on 1990 questions"

"NZART by its long involvement with the NZART examination question-bank and the examining process asserts intellectual property claims on the NZART website examination material."

Fred then suggested the following reply to the e-mail mentioned above:

"Can I suggest a comment here along the lines that "The question bank is the intellectual property of NZART and can only be used within NZART systems and procedures to ensure the integrity of the examination process is maintained".

In his letter Fred states that there is insufficient space to correct the inaccuracies in the Infoline release. I am sure that you will agree with me that the above statements from Fred contradict his subsequent claim for copyright. In recent email correspondence with a member who has been lobbying for the adoption of the package advocated by Fred, I have been told "Don't blame Fred for the legacy rubbish on the web, he does not control the web, it comes under the delegated control of Council. Council is solely to blame." And also "Fred's files would have been put on an alternative web site so that he could ensure that the files are up to date and do so without hassle and idiots messing things up."

I will let you draw your own conclusions re the above statements.

As many of you will have seen, my concluding statement at the end of the Infoline Special, sums this matter up "It is the intention of NZART Council not to follow the demands of Fred Johnson."

Vaughan Henderson ZL1TGC
NZART President

Contests

Contest Manager: Frank Hunt ZL2BR
<2bfrank@orcon.net.nz>

The NZART Memorial Contest

When: 6 & 7 July 2013

Times: 2000 – 2300 NZST both evenings

Band: 80m

Modes: CW & Phone

Rules: <www.nzart.org.nz/contests>

Logs: Logs as email attachments are welcome in either Cabrillo log text, plain text, Word or Excel format. Email them to <2bfrank@orcon.net.nz>. Paper logs should be posted to Contest Manager, 8 Manu Cres. New Plymouth 4310. Closing date for logs will be 31 August 2013.

Giving it a go!

Here is interesting email recently received from Graeme, ZL2APV:

"I am no contester with my experience limited to Field Day, Sangster Shield, Waitakere Sprint and VK Remembrance Day contests. I was talked into getting my feet wet on an international contest and the recent JIDX was suggested as a very low pressure moderate speed contest to try on.

Well I had a go and what a heap of fun it was. To get the feel I searched and pounced and even the 30+ wpm calls could be resolved after listening to them call CQ several times and usually they came straight back when I called them. I also discovered that they want your QSO very much and after you miss the info a couple of times they twig to your speed limitation and come right down to complete the exchange. After a few hours I found I was quite easily resolving calls as my high speed attention span lasted for the length of a call-sign so I tried some CQ calls. This greatly increased the number of QSO's per time and I was really getting into the swing of things. When the band went quiet I puddled around in the garden etc. but with a contest there was plenty of action most of the time.

Sending in my log was a breeze as I use the Linux log software called CQRLog and although it does not produce Cabrillo files I was able to export with an ADIF and use DXLab to import and make the Cabrillo. An email to the contest organizers with the Cabrillo attached and I had an acknowledgement in no time.

Post Contest was interesting as I received from 121 contacts, 39 LOTW, 20 eQSL.cc and 1 direct QSL's. That is a really high hit rate and I had great pleasure in responding to the direct QSL who had worked his first ZL. Another interesting thing was about 6 or 7 non-contest stations called me wanting a ZL contact. It seems that ZL is in good demand. The conditions for the contest were not the best with propagation on 20, 15 and 10 skipping over Japan. It is a pity it was not an Arctic Circle contest with signals from Iceland, Greenland and upper Russia booming in.

I thoroughly recommend having a go at an International contest and you can be sure I will be trying another but first I need to do something about my keyer, as manually sending CQ's and acknowledgements sure got tiring."

RSGB IOTA Contest – Have a go at this one!

Here is another international contest which provides a great opportunity for new contesters to get wet feet. IOTA stands for 'Islands On The Air' and 'island collecting' is by far the second most popular DX-ing type activity after DXCC entity chasing.

When: 1200 UTC July 27 – 1200 UTC July 28

Modes: SSB and CW

Rules: <www.rsgbcc.org/hf/rules/2013/riota.shtml>

This is definitely not a contest dominated by 'big gun' stations, the general operating style of the contest being casual and friendly. The vast majority of stations who operate in this contest are using fairly simple station set-ups plus many operators make a special effort to put a rare island on the air for 24 hours.

The exchange is serial number plus your IOTA number for those stations who are operating from an island. The New Zealand IOTA numbers are:

OC036 North Island
OC134 South Island
OC201 North Island offshore islands
OC203 South Island offshore islands

So have a go at being a rare station for 24 hours and put 'your island' be it North, South, Waiheke, or whatever, on the air.

Field Day 2013

Here are the results and a report from Stuart, ZL2TW, the FD Contest manager:

The weather was excellent over the entire country this year which made for an enjoyable weekend. Thanks as usual to all of you that participated, with the same number of field stations there was more activity (4 more branch points than last year for the same number of stations: 35) on 40 m than last year which is great to see. For some reason there were no CW only or overseas entrants, the latter would be explained by the reduced VK activity this year.

The Northern and Central regions first and second place getters swapped positions this year. Napier and South Taranaki were very close in contacts but somehow South Taranaki missed two branch points on 80 which sealed their fate.

Propagation on 80 was better than has been for a while, 40 performed well but with deep QSB on Sunday and the usual dead loss for the first hour or two on the Sunday morning. With even the 'big gun' stations making five contacts or less each for the first hour on 40m on Sunday morning one wonders if we should start 40 at 0700? This has been the situation for a number of years with poor propagation first thing written off by over the horizon radar.

Interest seems to be fading in the single station 80/40 section I will watch this over the next year or so and see how things go.

From my own listening I think there were less poor quality signals around, I only noted one station that was probably running low on 'volts'. Your average solid state HF transceiver likes to be well-fed: keep DC lead resistance low, batteries in good shape and you could consider a DC-DC booster, MFJ have one available.

There are always a few Elecraft kitset transceivers out there, but this year we heard a more basic QRP SSB kit (MKARS 80) on the air from Stewart near Nelson.

A few branches made their first appearance for many years: Far North Districts, Tararua (ZL2AJ as a single operator) and Reefton-Buller (ZL3DAC as a single operator).

Apologies for the first released results sheet, ZL1PZ was a home station operator and not a field station which has changed the home station placings.

Claiming branch points (multipliers). I understand that when you are scoring your entry and filling in summary sheets many of you are hesitant to claim a call-sign for branch number that you fear may not be valid. Each year there are a few stations that appear for a short period, make a few contacts giving out a branch number and then vanish, not achieving the minimum 20 CW or 50 phone contacts on a particular mode/band. Some of these will be obvious to you, others not.

My suggestion is that you go ahead and claim them anyway, I check every summary sheet and have to make corrections every year, it's not an issue for me.

Contacts needed to become a valid branch point (repeated from last year). Note that 20 contacts are needed to achieve this on CW for field stations and 50 on phone. These numbers are required as too few contacts mean many teams miss out on the chance to gain that branch point. It is getting tiresome seeing the same branches year after year coming on and 'giving out a few contacts' then going QRT. Those contacts are of no use, I remove them from the raw data when I calculate the final scores.

Field Stations not submitting logs. There were three stations this year that failed to do so, one achieved the minimum number of contacts the others did not. To find this out requires me to troll through submitted logs to work this out and is a complete waste of my time. It also prolongs the time my family loses partial or complete use of the dining table!

If you operated as a field station you make my day by submitting a log, and vice-versa!

Home stations not valid as branch points. Please note that you cannot claim branch zero

Correct use of Summary Sheets. Another annual problem. Download

Jock White Memorial Field Day – Results 2013

Posn	Call-sign	80m					40m					Total Mults	Total Score	Power Output	Branch
		QSO's			Branches		QSO's			Branches					
		Ph	CW	DX	Ph	CW	Ph	CW	DX	Ph	CW				
Montgomery Cup – Northern Region															
1	ZL1AA	373	230	1	33	16	328	193	4	27	14	90	384120	100	02 Auckland
2	ZL1AM	388	202	1	33	16	289	175	3	26	14	89	352084	100	28 Whangarei
3	ZL1CG	384	175		31	16	387	142	6	27	14	88	348304	100	77 Te Aroha
4	ZL1UX	280	95		30	15	319	55	2	27	14	86	220762	100	12 Hamilton
5	ZL4TM	328	160	1	32	16	169	48		26	12	86	218526	95	88 TECG
6	ZL1ZLD	285	153		31	13	186			22		66	143748	100	86 Musick Point Radio Grp
7	ZL1FND						393	104	2	26	14	40	68760	100	78 Far North Districts
Patea Trophy – Central Region															
2	ZL2G	422	216		33	16	375	176	5	27	14	90	396090	100	25 Napier
3	ZL2QF	409	235		31	16	361	163	5	27	14	88	382800	100	87 South Taranaki
4	ZL2AB	230	168		28	16		88			13	57	112290	75	27 New Plymouth
ZL3/4 Trophy – Midland Region															
1	ZL2KS	378	145		33	16	312	102	1	27	14	90	298350	90	22 Marlborough
2	ZL3AC	340	105	4	33	16	375	90	3	27	14	90	287100	100	05 Christchurch
3	ZL3VV	204	61	2	33	14	205	89	2	27	13	87	175479	100	56 Christchurch West
"4" Trophy – Southern Region															
1	ZL4AA	195	115		32	15	324	126	4	27	14	88	246576	100	30 Otago
2	ZL4AL	216		1	30		328		8	27		57	98154	100	08 Eastern Southland
3	ZL4GQ	96			22		195	34	4	25	12	59	63897	100	37 Southland
Single Station: 80m and 40m															
1	ZL1AB	99		28			220			25		25	30925	100	29 North Shore
QRP – W M Hall Memorial															
1	ZL1AC	318	152		32	16	143	126		26	13	87	241251	5	03 Western Suburbs
2	ZL1LC	213			27		202			24		51	63495	5	58 Helensville
3	ZL2KB	185	70		25	15						40	36200	5	69 Kapiti
4	ZL4TCA	48			16		169			26		42	27342	5	64 North Otago
5	ZL2STR	259			32							32	24864	5	26 Nelson
Single Operator															
1	ZL2AJ	243		2	29		270	2		26		55	86295	100	06 Tararua
2	ZL3BRC	325		1	18		250		4	18		36	63900	100	62 Reefton-Buller
1	ZL2GK	245	184		32	16						48	79440	60	24 Motueka
80m Only															
2	ZL1IB	203	88		27	16						43	45107	100	53 Te Puke
3	ZL2WB	443			33							33	43857	100	50 Wellington
4	ZL3GL	64			26							26	4992	100	34 South Canterbury
Phone Only– Hastings Trophy															
1	ZL2KO	454			32		416		15	26		58	160080	100	20 Manawatu
2	ZL1SA	441			33		366		3	27		60	147060	100	10 Franklin
3	ZL1CB	380			33		330		3	26		59	127440	100	40 Te Awamutu
4	ZL3RR	195		1	31		363		4	27		58	99992	100	68 North Canterbury
5	ZL2HV	174			31		129			25		56	50904	100	18 Hutt Valley
6	ZL3VH	195			33		56			25		58	43674	100	63 Upper Hutt
Home Stations															
1	ZL1PZ	78	49		26	16	136	94		24	14	80	108560	100	
2	ZL1JPS	79			30		119		1	27		57	34428	100	
3	ZL1BWG		80	1		16		98			13	29	26100	100	
4	ZL2SKY						164			26		26	12792	100	
5	ZL1MOF	125			31							31	11625	88	
6	ZL3AKM						52	11		22	7	29	6119	5	
7	ZL1AAR	14			8		45			19		27	4779	100	

the sheets and use them to do your scoring. It makes my job much easier, please note this includes sheets two and three for listing call-signs claimed for each branch. Also, please make it clear what section you are entering, many left this blank and you will have to accept which section I think you best fit!

If there is any confusion feel free to email me.

Team Comments

- Great contest, 40' pole broke in half, 'someone' forgot to tighten the bolts! Great family weekend and BBQ, nothing burnt this year
- Operators well behaved
- A very successful club event in glorious weather
- My CW is still @$#%, who is at branch ** (deleted but in Taranaki!) that insists on sending at 25 plus wpm!?
- 80 metres performed more consistently well throughout the contest than in previous years
- Less VKs than in previous years
- Late starting on Sunday morning "they said the generator would not start!!!"
- Thanks you for a good experience
- As we lost one of our team members to the ZL@%$ team, we should get a percentage of their points!

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International HF Contest Calendar for July/August 2013

Contest	Dates	Times (UTC)	Website
DL DX RTTY	Jul 6/7	1100 Sat – 1100 Sun	<www.drcg.de/>
IARU HF CW/SSB	Jul 13/14	1200 Sat – 1200 Sun	<www.iaru.org/contest.html>
RSGB IOTA CW/SSB	Jul 27/28	1200 Sat – 1200 Sun	<www.rsgbcc.org/hf/rules/2013/riota.shtml>
WAE (Worked All Europe) CW	Aug 10/11	0000 Sat – 2400 Sun	<www.darc.de/referate/dx/contest/waedc/en/rules/>
SARTG (Scandinavian) RTTY	Aug 17/18	0000 – 0800 Sat, 1600 – 2400 Sat & 0800 – 1600 Sun	<www.sartg.com/contest/wwrules.htm>

SPAM – Society For The Preservation Of Amplitude Modulation

Bill Olsen ZL4AE
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This month we look at the oldest radio station in New Zealand; Radio Dunedin, Station 4XD. <http://www.radiodunedin.co.nz>

We have a commentary from Martin, ZL4JH. A former NZBC maintenance technician, who nowadays contracts to various commercial entities for his considerable technical expertise. He is also very active in the local NZART Branch 30 activities and is has an active in role in the local AREC organisation besides being the Deputy AREC Area Manager.

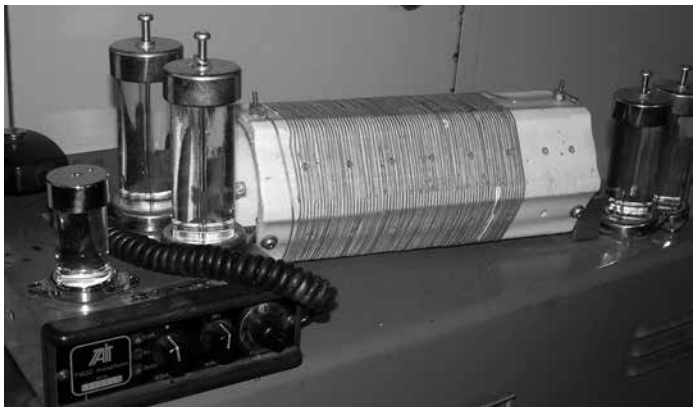
I cannot vouch for the accuracy of the following as memory tends to fade with age. A lot of the info comes from the website which has a complete history built into it. The catalyst for this article came from a meeting held by NZART Branch 30 at the "Highcliffe" Radio Transmitter mast site on the Otago Peninsula, earlier this year.

Before we get into Martin's reminiscences, some of my own memories as a schoolboy with Radio 4XD

The station began in 1922 and has been in operation ever since. It was the first in NZ. (It is actually 5 weeks older than the BBC!) It went through a variety of call-signs including "DN", "4AB","4ZB" (not to be confused with the Government Station of the same name), "Pioneer Radio" and, from 1948 until the 1980's, as "Radio 4XD" owned by the Dunedin Radio Association.

Sometime in 1959, I recall calling into the "lean-to" at the Calder MacKay building in Dunedin and meeting up with "Toots" Mitchell who showed me the "new" transmitter located on the premises and fed with open wire feeders to a centre-fed dipole on the roof of the building! It was a "MOPA" set which they had secured from the Government Stores Board and was modified for broadcasting by Phil Holden, the volunteer technician at the time. This transmitter (an AWA I believe)

Large final valve.



Large coils, note glass standoffs.

originally came from the "HMNZS Black Prince", a warship which saw service during WWII. It had a pair of 813 valves in the final stages and was modified to for 250 W input. (the licensed power at the time). (A similar set was at the RNZAF station at Taieri Airfield and used for "Ground – Air" communications).

He also showed me the transmitter it replaced, which was still on the premises and kept as a spare. It was quite large, used "rack & panel" construction and had a single 807 valve in the final. It had about 60 W input! (TVI was not an issue in those days). All this was fascinating to a 15 year old schoolboy, in love with radio sets.

But enough of my recollections; lets go onto Martin's memory, which is a lot more accurate than mine:

They were launched in 1922; fifth oldest station in the world and the oldest in the country. As a private amateur station, they had a variety of equipment in the earlier days, generally broadcasting from the top of the Calder McKay building in Rattray Street, Dunedin Central, next door to their studios.

They came to an arrangement with the then BCNZ transmission department and moved their transmitter to Broadcasting's "Centre Road" site, previously used as a receiving site for off-air relaying of broadcast signals, and/or for supplying back-up signals should the NZPO landlines fail.

The BCNZ managed to scrounge two transmitters for them and I think it was at the same time their frequency changed from 1430 kHz. to 1305 kHz.

Unfortunately, a local 3ZM listener wasn't impressed with the change of frequency as it affected his ability to receive the ZM broadcasting from Halswell in Christchurch. He torched the old timber building and their newly acquired transmitters!

With the assistance of the BCNZ through Brian McCammon, the then District Transmission Manager, two more AWA BTM2J 2 kW transmitters were obtained and Fletcher Construction put together a new building on the site. From memory, the plaque on the wall at the Centre Road transmitter site, where I was working today, notes 1986 as the opening of the new building and replacement transmitters. The site was in the middle of the farmer's

◂ continued from page 31

– Full marks to those that dusted off neglected Morse keys and had a go
– Deep fading on 40m on Sunday
– Supported by a local tractor driver/ dairy farmer
– Aussie DX poor this year?
– Lack of operators this year
– Band conditions good, stations just weren't there

Statistics

- 34 Field stations (one less than 2012) with 168 operators
- Log format (field stations): 26 paper based, 9 electronic
- 7 Home station entries

Valid Multipliers

Total of 94, maximum available to a field station is 90 (you can't claim your own branch point) although a home station could reach 94.

80 m phone (total 34); 02 03 05 06 08 10 12 18 20 22 24 25 26 27 28 29 30 34 37 40 50 53 56 58 61 62 63 64 68 69 77 86 87 88

80 m CW (total 17); 02 02 05 12 22 24 25 27 28 30 53 56 69 77 86 87 88

40 m phone (total 28); 02 03 05 06 08 10 12 18 20 22 25 28 29 30 37 40 56 58 61 62 63 64 68 77 78 86 87 88

40 m CW (total 15); 02 03 05 12 22 25 27 28 30 37 56 77 78 87 88

Invalid Multipliers (insufficient contacts made)

80 m phone: 13 41
80 m CW: 18 29 37 40 41
40 m phone: 27 41
40 m CW: 29 40 41 86

Check Logs

Received with thanks from home stations: ZL2YT ZL2AFT ZL1RL and ZL4NR

Magazine Survey

Compiled by Grahame Fraser ZL3SJ
<grahame.fraser@canterbury.ac.nz>

Amateur Radio (WIA)
March 2013

p.7 The Summer Loop: ultra-light magnetic loop antenna for pedestrian mobile
p.12 The 'Split 40': a split frequency QRP CW transceiver for 40 metres
p.26 QRM from in-home data transfer products using the electrical mains wiring
p.31 Reuse and recycle ... your antenna (broadband centre fed on H.F.can be worked against ground on 1750, 500 and 137 kHz

April 2013

p.17 Construction of VHF and UHF beams – A simple way
p.22 LiPo (lithium polymer) batteries for portable operations
p.32 The Arduino 'Dead Band Opener' – a simple accessory to save the drudgery of calling (automatic CQ caller)

CQ
April 2013

p.34 Ultra-Low-Frequency Communications (Ground conduction at audio frequencies)
p.46 Hints for kit building
p.94 Propagation: What are These Solar Flares ?

QST
April 2013

p.30 Remote Control of Accessories via the Internet
p.34 The Garden Beam (rotatable DX antenna)
p.37 An MCW Keyer for V/UHF FM
p.39 An Audio Tone SWR Meter for the Visually Impaired
p.43 Overvoltage Protection for ac Generators – Revisited
p.47 Done In One (night): Temperature Alarm (check on rig overheating)
p.48 Product Review: Yaesu FTDX3000 HF and 6 Meter Transceiver
p.54 How Close is Too Close ? (coupling between adjacent 2 m and 70 cm antennas)
p.59 HF Digital Voice with FreeDV (using VK5DGR's open source codec)
p.96 Vintage Radio: Heathkit SB-240 2 kW Amplifier

May 2013 Digital Communications Issue

p.30 Build a Linear 2 Meter 80 W All Mode Amplifier
p.35 Digital Modes for your SDR (Use your PC as SDR and to decode digital modes)
P.39 Microcontrollers – No Experience Necessary (Arduino)
p.46 An Easy to Build High Impedance Choke Balun
p.48 Product Review: Hendricks BitX17A 17 Meter SSB Transceiver Kit (including help with surface mount parts)
p.60 Hands-On Radio #124 The Beta Match

RadCom
April 2013

p.11 Obituary: Pat Hawker, G3VA
p.18 Homebrew: An IF amplifier strip based on the TL026
p.22 Getting started: in Datamodes
p.26 The HAK choked coaxial dipole (2 m to 20 m)
p.32 Antennas: Multiband wire antennas and the G4UDU portable antenna
p.35 Product review: The Elecraft KX3 ultra portable transceiver for HF & 50 MHz
p.74 Start Here: Continuing our look at the history of radio

May 2013

p.14 Activating Wainwrights:Taking amateur radio out in the Lake District
p.18 Homebrew: AGC generator circuits for the TL026 IF amplifier (and S-meter)
p.25 Antennas: portable multiband antenna; using the MFJ analyser as a GDO
p.30 Getting started in Sporadic-E propagation
p.36 Equipment Review: Rigol DSA815-TG 9kHz – 1.5GHz spectrum analyser with tracking generator
p.41 Waveguide filter sweeper
p.52 Start Here:Did Marconi really hear those transatlantic signals?
p.60 Design Notes: Efficient power amplifiers
p.64 A history of optical communication (50 years since first ham laser QSO; see also <http://modulatedlight.org/>

Sprat #154
Spring 2013

p.4 The "Twelvevolter" – Hybrid Receiver for 40m (ECC88 and EF95 with 12V h.t.)
p.9 A 6V6 CO/PA Transmitter
p.12 Modifications to the VK3YE Bigger Toy 40m Transceiver.
p.14 Temperature Controlled Soldering Iron

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maternity field, with many sheep dropping their little bundles that night, dead, as happens when they are disturbed at this crucial time.

Later, the Centre Road site was abandoned and the transmission moved to RNZ's site where the much taller mast resulted in greater aerial gain and an improved signal. At the same time, they also purchased a secondhand AWA BTM2 transmitter and that carried their signal for a number of years with one of the old AWA BTM2J's from the Centre Road site in place as a standby transmitter.

The second transmitter was dismantled for parts with the carcase residing in storage at Branch 30 for many years.

The next change was the purchase of an almost new, secondhand BE solid state 2.5 kW AM transmitter. This had been purchased for a radio station in the North Island that foundered before it started so it was transported south and Radio Dunedin technician, Brian Patterson ZL4NC retuned it, but as it was installed at the Radio New Zealand site, I got to maintain it. Pretty simple most of the time, replace the odd fuse and give it a vacuum periodically. Both valve transmitters were showing their age, being around 50 years old so the AWA BTM was taken off the air, and dismantled with the remains again finding their way towards Branch 30. The venerable BTM2J continued as the standby transmitter until failing power supplies led to it being taken out of service as "not economically repairable". It did still go, but with a massive hum; as we dismantled it, we found a well-cooked mouse right inside the main contactor, hanging across the terminals; we wonder if maybe it was part of the problem ?

During the preceding years, Radio Works had purchased Radio Dunedin and moved them into their studio complex where, despite still using volunteer announcers in the evenings and through the wee small hours, they rated very highly, at times outperforming Radio Otago, their parent. Maybe, this was something to do with most of the staff and announcers being from 4ZB of the 70's. Even to this day, they remain totally local with no network broadcasting and with a strong following.

The latest change saw a move from their rented RNZ site to the Radio Works own site. The original ACU was removed, a new dual coupler installed, and the BE transmitter moved to the new site beside "Bloem's" pig and poultry farm. You do not want to work on that site when the wind is from the wrong direction! And if anybody does DX on 1305 kHz, the signal will be down a bit as the shorter mast will be around 2dB lower in gain for ground wave signals.

As Radio Dunedin simulcast in FM stereo, the standby transmitter was no longer needed so Branch 30 AREC were offered some money to dismantle the transmitter and do what they wanted with it. Keep watching TradeMe®; some surplus bits and pieces might just pop up there!

Martin Balch ZL4JH

Well, that's about it for this month. A few photos of the 4XD transmitter are attached. All the bits & bobs are available from the Otago, Branch 30, Secretary plus lots more. Keep those cards and letters rolling in. The "inbox" is empty and I need more copy. There are a lot of stories out there and I want them, There are many AM articles to be written!

By the time you read this conference will have been and gone and I will have made a lot of new friends.

Bill ZL4AE

AREC – Amateaur Radio Emergency Communications

Geoff Gillman ZL3QR and Bev Gillman ZL3OV

AREC Mission Statement:
To be the preferred provider of Emergency Communications to New Zealand Emergency Services.

Hi, Everyone. The topic for this issue is communications for an equestrian endurance event, something comparatively new to AREC and different from what has been our traditional activities in that it is quite relaxed but with long hours on duty and with large gaps between periods of action. Here in North Canterbury we have been involved in five in the past twelve years and have found them most enjoyable. For reasons of space allocation, this story will be in two parts.

Marlborough Equestrian Endurance Event

On the weekend of 16-17 February 2013, MARC provided a communications net for the South Island Endurance Horse Riding Championship. This event involves riding Arabian style horses over varied terrain and some considerable distances with the longest trek 160km.

Event base was a wool shed 4.5km along Quail Dale road in the Waihopai Valley. The Event base provided a meeting point for the measured loops that made up the various course distances and was at the intersection of the two longest loops. Vet checks were carried out as the horses came around the loops, and the Event base provided rest facilities for horses and riders on the longer treks.

The possibility of a fire was a consideration and some areas were removed from the original planning, as the area is extremely dry. Final course layout was only approved a few days before the event. This meant the team had to be flexible regarding the location of some checkpoints, until two days before the event began.

There were four check points around the various courses from which the Event organisers required information. We took the opportunity to site test the area with VHF FM, our preferred option. Site testing was carried out by Paul (ZL2RE), Stuart (ZL2TW), Kaye (ZL2KU), and myself (ZL2IW) and my daughter, Rebecca, came along on the adventure to site test check point 4 in the Waihopai Valley.

We were assisted by several other stations in Blenheim and Tuamarina, who monitored our activities on simplex and surprisingly many simplex paths worked. The whole valley being hard, and dry, seemed to create many reflections which were were very unstable, creating the impression of a moving vehicle, even when stationary! Signals went from S9, to unreadable, back to S9, over about a 5 second period.

A decision was made to deploy the VHF STSP on the Eastern side of the valley. The 2 m 146.725 repeater was deployed to the property known as Churton, in the Waihopai. It functioned well and had surprising coverage from a relatively low elevation. Some phase distortion was noted on various paths back to Blenheim which wasn't a surprise as there is a lot of higher ground in the path.

Our intention was to cover all four checkpoints using the STSP repeater. The areas of interest, were a strip of land on the West side of the Waihopai valley, a single point further up the Waihopai, and several points in the Bank House / Ditchling area on Highway 63. The objective was achieved, but we also had a number of longer range contacts. Testing was completed mid-week.

Paul (ZL2RE), organised the radio positions, liaised with the local organisers, located the checkpoints near highway 63 and drove a huge distance in the process!

Check point 1 was located further West along highway 63. Bill (ZL2AYZ) manned this furthest position on both days.

Check point 2 was just off highway 63 near a property called Bandolier II. Harry (ZL4HGS) manned this position on both days

Check point 3 at Bank House was only able to be confirmed on the Friday before the event.

Check point 4 was manned by Paul (ZL2RE) on both days. This was the Southern position up the Waihopai valley, located near a forestry area.

Event base was delegated to Kaye (ZL2KU), and used our motorhome as the base. This enabled us to stay on location, which was quite important as the event began at 0300 on Saturday 16 February 2013.

Confirming location of CP4.

Site Testing Team: Kaye ZL2KU, Paul ZL2RE, Stuart ZL2TW.

Day 1 for us began on the Friday as we took the motorhome to Quail Dale, found a suitable location, and met the main organiser. The empty paddocks had been transformed into a tent, motorhome, and horse corral city.

We consulted with the TD (the Event Boss), and firmed up what tracking information they required from us. We also logged on to their local net via our PRS handhelds. This saved a lot of walking around looking for key people.

Kaye (ZL2KU), and I visited the STSP site just after dark on Friday 15 Feb 2013. It was obviously going just fine and functioned well during the event. Using the STSP repeater made the event net, very easy to manage, with mostly very strong signals; plagued occasionally with phase distortion, but over all, very successful

We returned to the base about 11pm. Rebecca, joined us as a helper. This proved very fortunate as I had underestimated the resources we would need at base. The radios being all functional, I headed away to work. Paul arrived at base prior to the start and added much valuable assistance.

Bill and Harry found their way to their positions, and the event commenced. The morning was a little chilly, with minimum temp of 7 degrees. Our fears of not being able to see competitors (and their numbers), was unfounded. The riders carried head lamps, and the motion of the horse gave the lights a tell tale signature. The riders also tended to arrive in small bunches at a check point, but were very helpful in relaying their numbers by voice to make sure the radio operator had the correct information.

After sun up, it became obvious that it was going to be another really hot day. Max temperature in the afternoon was about 30 degrees, and even hotter in some exposed locations.

Check point 3 was opened later after day break. All was well until they came to erect the sun umbrella. Somehow the centre pole had been left behind. A mutiny was somehow avoided and alternative shade

View of course from western elevation the STSP Repeater and its location.

Looking SW towards CP4 from STSP.

provided. However, the mental picture of a very colourful turtle in the paddock remains. Communications from the turtle shell were uncompromised, and the event continues without a hitch.

Paul headed in to checkpoint 4 around sun up. This checkpoint was amongst trees, so Paul was initially a little chilly, but later the shade proved to be most welcome.

The horses on the long trek (160 km) were finished about 3 pm. The finish was quite impressive, with two riders galloping their steeds neck and neck into to the finish area,. Interestingly their time does not cease at this point; the clock continues ticking until the heart rate of their horse returns to 64 beats per minute. When racing the heart rate is around 180 beats per minute. During intermediate loop checks, 26 minutes is allowed for this heart rate reduction and 30 minutes for the finish loop..

When the horse has come through the start/finish gate, the ground crew (apparently known as 'strappers') take the saddle etc from the horse and spray the horse with water to cool it. The vet checks the horse during this process. The actual checks are quite stringent and applied in an approved manner to each horse.

At base Kaye and Rebecca were into the swing of things. The radio base became a go to place for information on riders, lost property, PA announcements, and cups of coffee for cold vets and ground crew. Rebecca became quite adept at announcing the imminent arrival of riders which gave the start finish crew, and vet crew some notice. We later received praise for the quality of these PA announcements.

We were able to release check points 1 and 2 about mid-afternoon. Thanks so much to Bill and Harry for enduring the heat of the day.

Chris and Tony at checkpoint 3 had to wait a little longer until their loop was clear. Thank you very much for providing good communications under such intense heat (with an improvised shelter).

A highlight of day one was a stock problem near Harry's position. This was variously reported as a bull, steer, cow, heifer.? The translation was that there was something relatively large that may, or may not, relate well to passing horse traffic. The organisers sent some assistance.

At the base there was a prize-giving for one of the events as some of the competitors had to travel that evening. Then there was a briefing for the next day.

Marlborough Amateur Radio Club received quite a lot of praise for our efforts. Thus expectations of us were high for the following day.

I was surprised to hear that one of the precautions involved being aware of the lack of wind in some sheltered areas of the course. This is due to the fact that a breeze helps dissipate the heat generated in the horse's body; i.e. no wind means slow down to avoid overheating your horse!

Rob Carter ZL2IW.
For Marlborough AREC
(To be continued…)

Activity Briefs
(A selection from Mar/Apr)

1/3/2013. Tauranga ECG Branch 88. Sports & Training. Ngamuwahine Lodge Prepare plan to test communications for up coming inaugural Goat Run from Waiere Falls to Aongatete Lodge, Katikati on the 23 March. Decision to use two repeaters to cover the track, one on ESB60 and second repeater on ESB57.

1/3/2013. Motueka Branch 24. SAR Training. Greenlink Caves, Takaka Hill. National Caving SAREX. A National Caving SAREX is normally held every 3 years, and usually in the Tasman Region because of the large selection of caves available in the area. This Caving SAREX was spread over three days commencing at 0800 on Friday 1 March and ran 24 hours a day, finishing with a debrief at the Takaka Hill caver's hut on Sunday morning. The comms consisted of a VHF link between the Motueka base, the Caver's Hut, the cave entrance, and the staging area on the side of the Canaan Road. Our operators at the base worked 7 and 8 hour shifts over the three days. AREC operators were assisted by LandSAR operators who were either in training or proficient at it. The scenario was a rescue of an injured caver, and this was successfully achieved in the time frame available.

16/3/2013. North Canterbury Branch 68. Rural Fire. Waimakariri River. Fire in gorse/scrub near Eyrewell Forest, caused by two cars being trashed/burned. Two Forestry units called to assist NZFS appliances in mopping-up operations. AREC supplies Comms/Logistics for Forestry units.

18/3/2013. Nelson Branch 26. Sports & Training. Rainbow / Molesworth/ St James area. Mountain bike race from Lake Rotoiti to Hanmer Springs. Training exercise for AREC members and to provided radio communications for the 106 km event.

30/3/2013. New Plymouth Branch 27. SAR. Mt Egmont/Taranaki. Male phoned 111 saying he was lost, phone contact lost and when police phoned him back went to voicemail, message left. One team sent in overnight and two the next morning, he was located by second team near a river, fit and well, and airlifted out by helicopter.

30/3/2013. New Plymouth Branch 27. SAR . Mt Egmont/Taranaki. Male and friend reported overdue from tramp around the mountain. After exhaustive enquiries by police over night they were located at home at 4:22 the next morning.

1/4/2013. Westland Branch 49. SAR. Croesus Track, Paparoa Range. 43 yr old Dutch female overdue, should have been in Blackball by Monday. She failed to collect food left at hut for her on Saturday, which meant she had been missing since then. Aerial search with NVG's and a dog team on the tops Monday night with no sign, full ground search Tuesday morning. Found late morning in lower Moonlight track trying to make her way through windblown trees and slips on closed section of track. Comms on DoC3 ES118 and SAR ESB58 repeaters.

3/4/2013. Wellington VHF Group Branch 74. SAR Training. SAR Radio training evening, Wellington LandSAR. Invited to the radio training as the VHF Group Special Interest Group. Around 25 LandSAR plus a good turn of amateurs for training on HF, VHF, repeater set up, voice op. procedures and gear issue. An important session on details of using the Tait radio, in particular the backscan feature. This now scans ESX07 and MSX27. This is Ch. 1 simplex and the AIROPS channel. When on a repeater channel, you can hear any traffic on those two channels. Great for when you get out of repeater range or the helo flies over and they can always talk to you. Repeater setup

continued on page 36

continued from page 35

is normally done by AREC, but training the teams to do this is a great idea when the repeater has to be carried to a hill top. Of importance is leaving the bag on site! Going to recover a repeater and not having the bag is really hard; they hate having loose things in the helo!

3/4/2013. New Plymouth Branch 27. SAR. Patea Dam. 2 males reported overdue from hunting trip. Missing persons located by helicopter.

10/4/2013. Southland Branch 37. SAR. Gore. Wanda Trak call-out for a missing wandering elderly woman. AREC was required to assist with operating a second tracking receiver. Travelled 45 min to the search area in Gore. Woman was found by AREC alive and well shortly after in a nearby front section.

10/4/2013. Wairarapa Branch 46. SAR. Palliser Bay, Wairarapa. Search for 22 year old in the Haurangis for a hunter who had failed to return to Kawakawa Hut and had spent two unplanned nights out. On Tuesday morning he had spoken to his father, who was not far from Kawakawa Hut, by CB radio, saying he was on his way down to that hut via a stream. The radios only have a short range and all the information available suggested this hunter was in the area of Kaiwhiri when he said he was dropping into a stream. A deer he had shot the day before, and a deer head he'd stashed last Roar, were in that area. An intense search of that area failed to locate him because he remained mobile and, for whatever reason, kept walking North until he reached workers on the road at Ruakakapatuna. This is despite having seen a helicopter searching in the other direction. Teams from Wairarapa, Wellington and Manawatu were involved.

15/4/2013. Wairarapa Branch 46. SAR. Gladstone-Eastern Wairarapa. Search for 10 year old boy who went looking for the air strip where a top dressing plane was working from. He got caught out in the dark and found a digger in the forest and got in it and turned on the hazard lights until search teams located him.

19/4/2013. Wellington VHF Group Branch 74. SAR Training. Big SAREX with helo support. 9 field teams, 7 AREC on site, Helo, 15 Police SAR Squad, 7 Missing parties, press, DoC, AREC provided VHF comms via AREC repeater on Mt. Baker, HF on site and remote HF facilities, as well as support from remote operators. Three days.

20/4/2013. Westland Branch 49. Sports & Training. Greymouth. Around Brunner Cycle Race. Provided comms around the race course at five static locations, race base & tail car. Successful event with no problems, finished in record time at 1545 hr thanks to a strong tail wind. All comms were on our 695 repeater and monitoring St John.

24/4/2013. New Plymouth Branch 27. SAR. Mt Egmont/Taranaki. Trampers hypothermic, requesting assistance. Two trampers airlifted off mountain.

28/4/2013. Manawatu Branch 20. SAR Training. Kahuterawa Forest/Sledge Track. Low angle rope exercise and hover load to helicopter training to set up repeater and radio comms. Two teams did hover training with helo and low angle ropes.

Conclusion

Thanks to those who have contributed to this issue. Material for the next one please to be in our hands by 3 July 2013. Photos, if included. preferably on a separate CD (with captions) mailed directly to us. E-mail pix may be acceptable but will be at the Editor's discretion and must not be embedded in the text. Contact details: <zl3qr@nzart.org.nz> or <zl3ov@nzart.org.nz> or post to 6 Boyd Street, Rangiora 7400, or phone (03) 313 7137.

(N/B. Articles to please be in doc. rtf or txt format. Publisher or pdf we can not use. Thanks.)

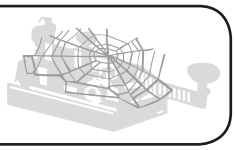
Reminder

The next Section Leaders Nets should be 17 June and 15 August, 3900 kHz USB at 1930 hrs NZST unless notified otherwise.

Until next issue,

73, *Geoff ZL3QR & Bev ZL3OV*

Silent Keys



The Association deeply regrets to record the death of the following members and extends its sympathy to the bereaved.

Silent Keys: guidelines to contributors

Contributors are requested to limit their obituaries to between 200-400 words. Content should focus mainly on the amateur radio activities of the deceased. Normally photographs cannot be included.

Vic Stagpoole ZL2ACF

The death occurred recently of Vic Stagpoole ZL2ACF, aged 88, after a brief illness. Vic was remembered by both Cliff Walker ZL2ALY and Trevor King ZL2AKW as a technician making a great impression in his white dust coat when they began work with Broadcasting in the late 1940s and 50s. Bob Morris ZL2AVM, who worked with Vic at CIT, helped by Vic's family, has provided some information to fill out the picture. Vic, he writes, was a radar technician with the Air Force, in the Pacific Theatre in the latter stages of the Second World War, working on Ventura and Catalina aircraft. Post-war he worked at Quartz Hill (Broadcasting's receiving station), when it was just a single-room entity fully exposed to the elements. He moved to the Forest Service, at Kaiangaroa, then to head office in Wellington before taking a tutor's position in the electronics department at the then Central Institute of Technology, in Petone. CIT later moved to Heretaunga. Vic was a senior tutor when he took early retirement on the eve of significant changes in the teaching syllabus. "Vic is particularly remembered for his enthusiasm for FM broadcasting and anything connected with audio engineering... He helped design and build the excellent anechoic chamber at CIT." His interests were more extensive, however, encompassing music (the Wellington Music Society) and the restoration of steam engines. His amateur radio interests were principally aligned with VHF wavelengths. Several amateurs were spotted at the funeral on 5 April 2013.

Ian William Ogier (Rev) ZL1AF

Was born in Palmerston North during the depression years in July 1928. Ian attended Palmerston North Boy's High School from1943 until 1947 where, in addition to his studies he enjoyed involvement in sport and was Captain of the second rugby fifteen. Ian also was involved in the Cadets Force Signal Corps and was a Boys' Brigade leader at church. Upon leaving school he decided to go into the Ministry with the Associated Churches of Christ and attended Bible College in Dunedin where he met and married his life-long partner Lola, in 1951. The following year Ian took up his first pastorate at the Auckland Dominion Road Associated Church of Christ.

During 1964 Ian and Lola moved to Christchurch where he was a pastor for one year and also studied for a post graduate degree in journalism. In 1965 they moved north to Whangarei, first working in a combined Presbyterian-Methodist-Church of Christ pastorate then finishing his working life teaching for 12 years at Kamo High School, before retiring in 1989 and returning to his home town of Palmerston North.

Ian had a life-long interest in ham radio as a hobby and was an ardent homebrewer, building his own equipment as well as experimenting during the early years of solid state SSB construction. He was Secretary of Branch 20 for several years, was a regular in daily group skeds and enjoyed portable operation while on holiday. In retirement he continued his pastoral involvement in Palmerston North and did research for the Palmerston North Arts Council. Both he and Lola helped at the Regent Theatre. As a couple they travelled widely to Eastern and Western Europe, Scandinavia, Egypt, Israel, Japan and the Americas.

We offer his family, daughter and grandchildren our condolences in their sad loss.

Bryan Anderson ZL2AFT

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Monitoring Service

Monitoring Service Co-ordinator: John Martin ZL1GWE
<john.martin@nz1.ibm.com>

Monitoring Service

Greetings to all, including Short Wave Listeners and contributors. It never ceases to amaze me, what one can find on the HF bands from time to time. For instance digital modes, sitting side by side with other Radio Amateurs in deep conversation on J3E/U on 15 metres and 20 metres, never noticing that a Chinese proprietary digital system suddenly erupts beside them. They were obviously oblivious to the 4 + 4 carrier Differential Quadrature Phase Shift Keying (DQPSK) [1] 75 baud (100 Words per Second (WPM) system moving from idling to full screaming encryption mode beside them. This system is said to have the ability to have an error free rate of up to 95 percent in practice. It consists of 2 groups of 4 channels – channels 2 and 5 first, followed by 3 and 6, then 4 and 7, and finally 1 and 8. The separation between channels 4 and 5 is distinctly wider; for those of you who are interested, the decoded traffic looks something like this:

XYXYXYXYXYXY
OK QSL IS 1822 AHR HR MSG GA HW ? TKS /$
XYXYXYXYXYXY
OK HR MSG CLS 06 GA PSE CY
13106–––0935
3407 4560 7627 6784 3415 9196 8336 1684 4086 0928
7935 6763 5934 1659 7474 1960 0325 7241 2120 6460-1
6342 9292 4594 4910 5749 6519 1371 4676 0301 0002

Figure 1 is a close up view of the offending signal (2 kHz bandwidth). The transmissions are only interrupted by J3E/L (LSB) voice transmissions calling out in Chinese to a far flung Diplomatic Mission somewhere in Asia Pacific.

To me, it sticks out like a sore thumb. Once one is homed in on the pesky intruder, it is relatively easy to spot a sequence of trends, shifting over several evenings to 20 m as well. In one case, up came the offline encryption system as well, with another set of 8 tonal carriers, beside the main transmission. The signals were duly verified by Region 1 assistance and reported via the monthly report to IARUMS Region 3 and NZART. The other marauders are now identified as Iranian (EP) Over the Horizon Radar (OTHR) system, thumping away on 10 m and up to 36 MHz recently due to increasing propagation conditions. These are wideband with characteristic beeps with several transmission bursts of 300 plus pulses per second and moving quickly to over 800 pulses per second bursts in a few seconds.

Another realisation or breakthrough has occurred during April and still being investigated during early May 2013, is the historical Ionosondes[2], previously used for analysing the upper reaches of the Ionosphere, for predicting the depth of the various ionised layers. Although the same technology, has been now turned into the detection of geoseimic activity, particularly in Northern China. Another version has been found; Oblique Ionosondes, which often accompany OTHR systems, as a means of determining the state of the flux density priority to transmitting burst transmissions. For many years, they were designed to transmit vertically upwards into the Ionosphere. Now this fact may be quite boring for the casual observer, but the veteran observers dig deeper under the surface and through research, quickly finds out that many nations have these low power sources to 500 watt transmitters including those found in Australia, New Zealand and many other places globally. When one realises that the Ionosondes or can ionogram, a graph of reflection height (actually time between transmission and reception of pulse) versus carrier frequency. Reference[3] hirpsounders are in fact a special type of radar system for examination of the Ionosphere, it becomes quite a fascinating subject. The transmitter sweeps all or part of the HF frequency range, transmitting short pulses. These pulses are reflected at various layers of the ionosphere, at heights of 100–400 km, and their echoes are received by the receiver and analysed by the control system. The result is displayed in the form of

Just, when you thought you had the other types of Ionosondes embedded into the brain, my observant colleagues discover "backscatter Ionosondes" which is used to characterise the ionosphere for range-finding and/or to identify the best frequency for the OTHRs at that moment). Which we are now beginning to understand the relationship and how they are used prior to or during OTHR transmissions on the HF bands.

Fortunately, Software Derived Receivers (SDRs) make this very visible and even more tangible, whereas previously we could hear the sweepers, now one can track their path across the computer screen.

What surprises will turn up in May and June? Perhaps Radio Free Asia (RFA), will change its schedule can come and haunt 15 metres yet again or other mysterious signals?

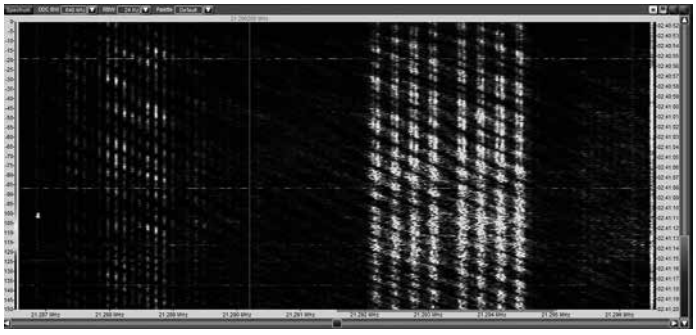


Figure 1. Chinese proprietary digital system.

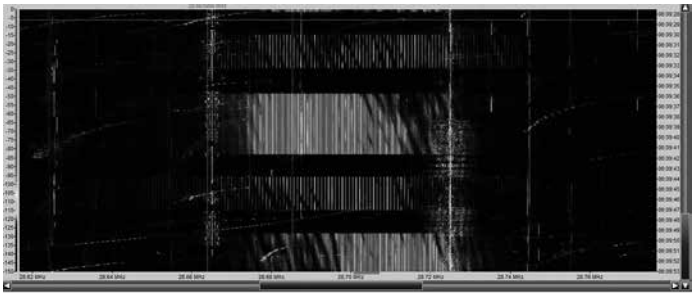


Figure 2. 10 Metre EP OTHR – note the non-amateur intruders on both sides A3E and F3E transmissions'.

Intruder System Observer League Table 2013 (up to end of April 2013

Contributor Name/ Call-sign	Number of verified reports
John ZL1GWE	274
Bob ZL1BAD	156
Stephen ZL1TPH	2
Rex ZL4IV	4
Bert ZL1VT	3
Gary ZL2iFB	2
Tony ZL1TTG	1
Ken ZL4NR	1
Cliff ZL4AS	1
Others	0+

Thank you for all contributors during the last couple of months. If you have a signal you cannot identify, please provide an audio sample, and we will attempt to recognise it for you. Please report intruders to: <MS@NZART.org.nz> or <MS2@NZART.org.nz> or <IntruderWatch@GoogleGroups.com> or to your favourite DX Cluster. Please include if possible, the frequency, time in GMT or UTC, mode, strength and direction (if available). A real bonus would be an audio sample, long enough for identification purposes and any observations you have. If you have any questions, do not hesitate to contact me directly.

John (ZL1GWE)

References

[1] <http://en.wikipedia.org/wiki/Phase-shift_keying>
[2] <http://en.wikipedia.org/wiki/Ionosonde>
[3] <http://en.wikipedia.org/wiki/Ionogram>
[4] <http://www.ips.gov.au/IPSHosted/INAG/uag-104/text/ken.html>

WARO – nz womens amateur radio operators

with Topsy ZL2LS and Ngaire ZL2UJT
<waro@nzart.org.nz>

From Topsy ZL2LS

By the time you will receive this, Conference at Solway Park in Masterton would have just finished and I say in advance was great to see you all again and catch up with you all.

What's been happening down here in the south these last two months, as most of you would have heard about one of our members has had complaints made to the local council re his aerial in his back yard. There has been a lot of activity re this, but he has had the support from amateurs from NZ and around the world and he has full support from his club here in Nelson. It has now been resolved for the time being and now he can get back to enjoying his hobby.

I haven't been doing a lot just really busy at work, I had organised the radio communications again for the annual Rainbow Rage bike ride from Lake Rotoiti to Hanmer springs; 106 km of rough mountain roads, having 12 operators out in the field from start to finish, but hey I have actually ridden it four times so can't be too bad!

Even though I have done it four times, each time I finished I said I wouldn't do it again but it took four times for me to stop. It is great fun but a long day on the bike.

From Ngaire ZL2UJT

Hi to everyone from the North Island. What an amazing summer we have had. I felt so sorry for the farmers throughout New Zealand, but from our point of view it has been heaven here in New Plymouth. People have been flocking to the beaches and walkways.At this moment it is pouring with rain, so I guess the drought is broken. The last couple of months have been stressful as my OM Graeme ZL2APV went through his second major heart operation in 7 months. Thankfully as I write this all seems to be going well. He has been enjoying his radio hobbies, and especially his CW which he loves. I don't know about you but CW has never been my thing, I prefer to talk on the radio. I must admit I really appreciated Amateur Radio when we were returning from Waikato Hospital, only 2 days after operation and the whole way back people kept in touch through the National System and local repeaters. It was so reassuring to have them there as cell phone coverage is very limited many areas from Waikato to Taranaki. There is something special about the companionship of radio people and at times of stress it's a real boost. I am really looking forward to our new Taranaki Award, it brings all our locals back onto the radio and we also catch up with friends from all over New Zealand who have participated in the Rhododendron Award for many years.

Taranaki Award

The Award will run from 10 August till 15 August 2013 Inclusive. Note: change of finish date; 15 not 18 August. It is available to all Amateurs and short wave listeners.

Full details of these awards are given in the Awards column on page 29.

Thelma Souper

I hope that we will manage to get good numbers and support for this event due to it being cancelled previously for lack of support. Thanks to all those who took part in this, and we hope that you all enjoyed it.

WARO Email

Just to remind people; please when sending information into both of us, can you please remember to use this email as it will then go directly to us both, this makes it a lot easier for us to work on the column together.

The email address is <waro@nzart.org.nz>

Those were the days

Recently I was given a great pile of old *Break-In* magazines that go back to 1966 and I will be going back through them and take the odd article or picture from the WARO column, and will put them into *Break-In* for us to try and remember way back when:

May 1966: Zelda ZL3AAB who was the secretary / Treasurer was reporting that the conditions on 80 m for the first "CQ YL" night were poor but was hoping that the conditions for future contacts on the fourth Tuesday of each month would be better, and was reminding everyone that the conference in Nelson was coming up and sent out best wishes to all those attending, and that the annual subscriptions were due and would be five shillings. This was to be the Fifth Annual general meeting of WARO.

That's all for May 1966 where my books start.

A VHF Convention was held at Auckland over Easter 2013. On the Monday a visit was organised to the Auckland University of Technology Radio Telescopes at Warkworth. The three WARO members pictured enjoyed the visit with their OMs and were photographed chatting in the equipment room of one of the telescopes.

Cheers, take care and enjoy the great hobby of Radio.

Topsy ZL2LS
and Ngaire ZL2UJT

WARO Get Together at Pirongia.
Back row: Biny ZL2AZY, Aola ZL1ALE, Margaret ZL1MB, Lynnette ZL1LL, Durlene ZL1ULK, Alison ZL1TXQ, Marlene ZL1MYL, Maxine ZL1FW.
Front row: Carol ZL1AJL, Celia ZL1ALK, Joline ZL1UJB.

Errata; the photo displayed in last month's *Break-In* had an incorrect caption. The correct caption is: *Left to right: Maxine ZL1FW, Lorraine ZL1BPM, Joline ZL1UJB, Ngaire ZL1KN, Laureen ZL1BTP, Lynnette ZL1LL, Maureen ZL1MYL, Margaret ZL1MB.*

VHF Convention visit; left to right: Maxine ZL1FW, Rosemary ZL1RO and Angela ZL2TI. (Photo courtesy Stephen Hayman ZL1TPH).

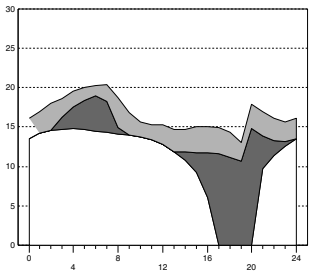
Answers to crossword on p23

Across: 1 Emergency, 7 huia, 9 exhausted, 10 Tet, 11 gorse, 14 skimmer, 15 nor, 16 emu, 17 fatal, 18 detector, 21 pierced, 23 ohms, 26 impeller, 27 software, 28 LY.

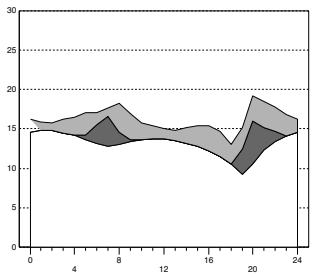
Down: 1 energy, 2 ethernet, 3 East, 4 cheeky, 5 automatically, 6 natural, 12 some, 13 eruct, 18 diodes, 19 op, 20 ripple, 22 daraf, 24 sent, 25 visa,

Ionospheric Predictions

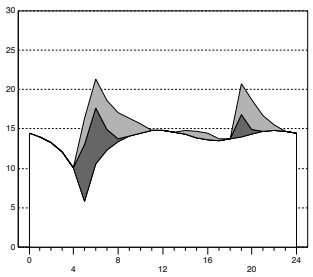
JULY / AUGUST 2013 **T-index = 68**



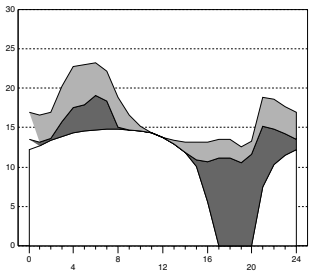
WN-Moscow (SP) 16548 km 312°



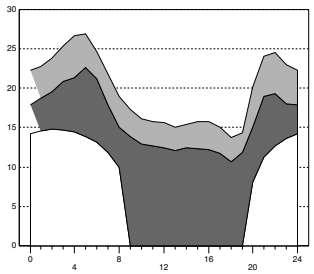
WN-London (SP) 18814 km 343°



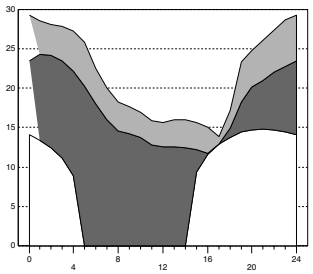
WN-Jo'burg (LP) 28265 km 31°



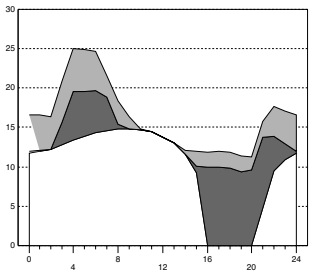
WN-Istanbul (SP) 17168 km 281°



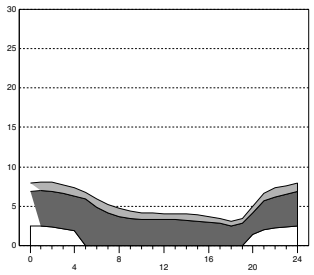
WN-Tokyo 9274 km 332°



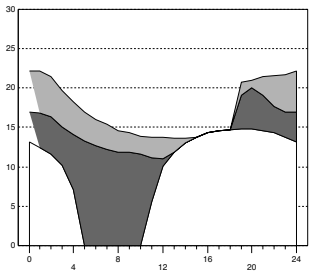
WN-San Francisco 10859 km 45°



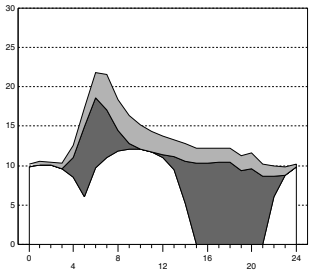
WN-Cairo 16519 km 261°



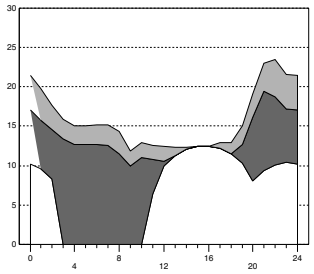
WN-New Zealand 300 km



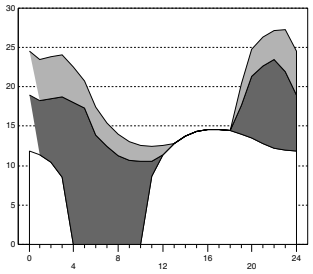
WN-New York 14402 km 66°



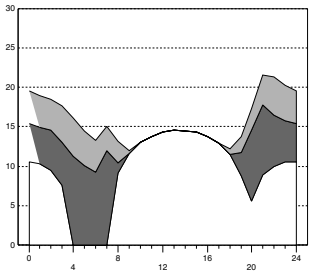
WN-Jo'burg (SP) 11759 km 211°



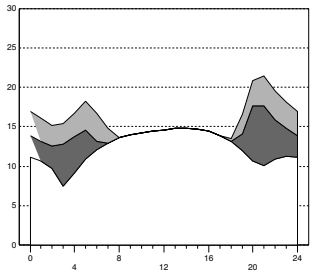
WN-Rio de Janeiro 11780 km 144°



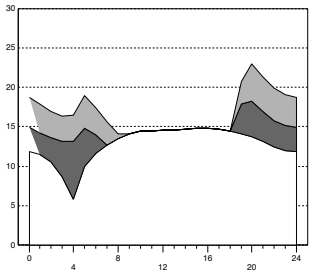
WN-Barbados 13962 km 104°



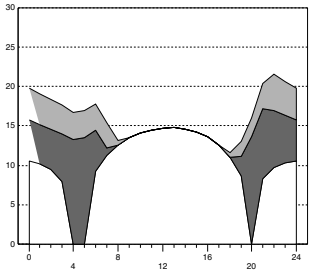
WN-Dakar 16862 km 155°



WN-Moscow (LP) 23476 km 132°



WN-Istanbul (LP) 22856 km 101°



WN-London (LP) 21210 km 163°

Horizontal axis shows time in UTC.

Vertical axis shows frequency.

Propagation is possible in the shaded areas, with best operation in the darker area.

These predictions are based on solar activity data supplied by IPS Radio and Space Services.

See pages 6–9, Break-In May/June 2004 "Choosing the Best Frequency" by the late John Gabites ZL2AQ for interpretation of forecasts and explanation of terms MUF, OWF and ALF.

HAMADS

WANTED: RADIO VALVES. Cash paid for old radio valve collections. Also wanted are vintage amplifiers, speakers and tape decks. Please Telephone Paul at (09) 528-2022 or E-mail <paul.ssegrub01@gmail.com>.

WANTED: Tait T500 2 channel UHF Transceiver. Also a Tono MR-150W 2 metre amplifier. Contact Steven ZL2KJB. E-mail <sebarriball@gmail.co>.

WANTED: Kenwood TM733 dualband Transceiver any condition considered. Replies to ZL4OC. E-mail <bob_smith@clear.net.nz> or *Call Book* Address.

WANTED: Valves wanted to purchase, fair price paid, all types but esp following types ECC32 ECC33 ECC34 ECC35 B65 6SN7 6SL7 ECC81 ECC82 ECC83 ECC803S ECC88 E88CC E188CC 7308 EF86 KT61 KT66 KT88 EL34 EL37 PX4 PX25 GZ32 GZ33 GZ34 GZ37 CV378 CV575 VT52 45 50 211 801 805 845. Also looking for an AVO or Weston Valve Tester and a good quality capacitor tester. Geoff Edwards, Valve Radio Spares, 12 Oxford St., Lyttelton 8082. Telephone (03) 328-9208 or (027) 433-8452 or Fax (03) 328-9207 or E-mail <tubehead@xtra.co.nz>

FOR SALE: Where are all the constructors? I have most of the parts (mostly new) to build a 2 X 3-500 amplifier. These are surplus to requirements. Contact ZL4NR. Telephone (027) 381-8763 or E-mail <zl4nr@xtra.co.nz> or *Call Book* Address.

FOR SALE: Kenwood TS-480HX, 200W, near new. ADSL internet installed allowing remote operation. Excellent DX. (See also Nally tower advert). $1250. Contact <warwick@ayreslegal.co.nz> or Telephone (09) 309-3202.

FOR SALE: Newly installed 50' Nally tilt-over crank up tower. Currently with hex beam but tower and rotator can take any combination of beams. Hex beam included but can also be separated. Bolted to foundation on property at Dairy Flat near Auckland. Buyer to remove. For photos, info and offers contact <warwick@ayreslegal.co.nz>. or Telephone (09) 309-3202.

FOR SALE: Heathkit IG-102E HF signal generator, 6 bands; 100 kHz – 110 MHz. Any offers, must sell. Wide selection of 3 and 10 turn potentiometers ("Helipots") and multi-turn dials for sale. Contact John ZL3IB Telephone (03) 348-9084 or E-mail <john.zl3ib@ihug.co.nz> for details and list.

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Hamads and Classified Advertising in *Break-In*

Hamads up to 30 words are now free as a service to members but the following conditions will apply:

(1) Hamads. A single, free Hamad in each issue of *Break-In* is only available to financial members and Branches of NZART buying or selling personal equipment. Members and Branches wishing to use this service must include their NZART Membership Number or other evidence of membership. If possible they should use the official HAMAD form (on the reverse of their address sheet). If this is not convenient the advert may be emailed or sent typed double-spaced, but proof of current membership must be provided.

Each free Hamad is limited to 30 words; any extra words will be charged at the current rate of 25c per word, telephone and fax numbers count as two words each, e-mail addresses and *Call Book* address as three words each. All prices include GST. Free Hamads will also be accepted for sales of deceased estates where the member was a financial member of NZART during the past 12 months and from branches who are financial members of NZART (ie have a Membership No).

Advertisements are accepted in good faith from amateurs and may only be used be the sale of used radio and allied equipment. The Association, or its representatives, can take no responsibility for them nor take part in any discussion resulting from sales or purchases; remember "Caveat emptor". In case of dispute, the Editor's decision is final.

Trade or business adverts, even from members, will not be accepted here, since this is a subsidised service to members.

(2) Classified Advertisements are available to members, non-members and commercial firms offering products or services for sale, etc. All adverts not meeting the Hamad criteria will be considered to be Classified Advertisements.

Classified Advertisements will be charged at 40c per word. Bold type is available at 50c per word. For semi-display (ie rule above and below) add $5.00. All Classified Advertisements must be pre-paid, receipts will not be given. All prices include GST.

(3) Display style adverts will be still be charged for at the current rates.

(4) Closing date. Please send Hamads and Classified Advertisements to The Advertising Manager, PO Box 1733, Christchurch, to be received no later than the 10th of the month prior to publication. Please make cheques payable to NZART; no cash or credit cards. The Editor and NZART Inc reserve the right to discontinue or decline any advertisement.

For further information and commercial advertising rates, please contact:
Lorne Douglas ZL2AHB, Advertising Manager, c/- PO Box 1733, Christchurch. Telephone (03) 358-9100. E-mail: <hamads@nzart.org.nz>.

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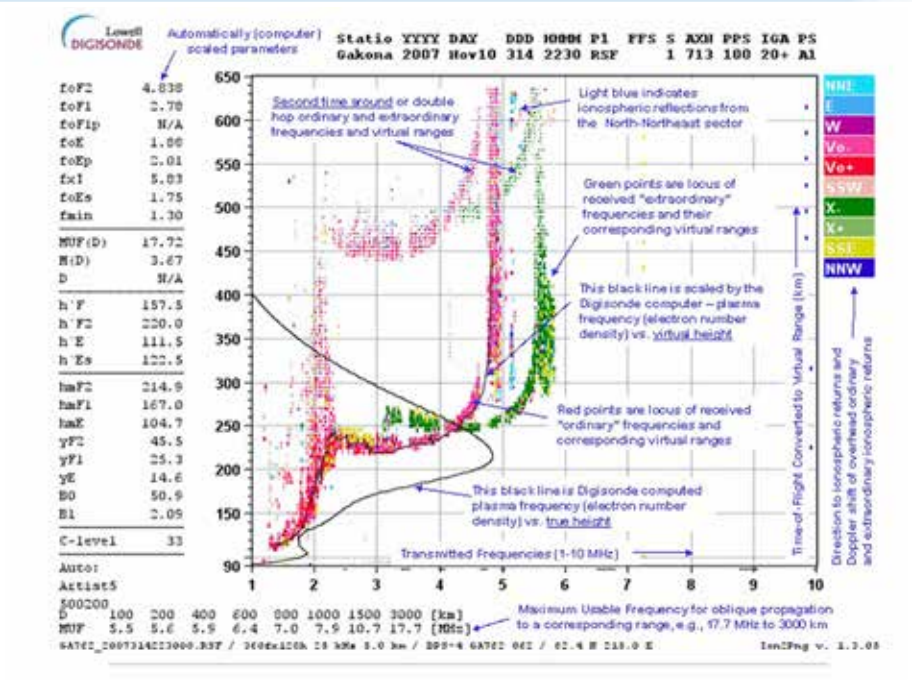

An ionogram, a graph of reflection height (time between transmission and reception of pulse) versus carrier frequency. (See Monitoring Service page 37).

Inside the Army Sigs Museum, Simpson Barracks, Melbourne.

VHF Convention visit; left to right: Maxine ZL1FW, Rosemary ZL1RO and Angela ZL2TI. (Photo courtesy Stephen Hayman ZL1TPH).

Large tank coil from Radio 4XD. T182 for size comparison.

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